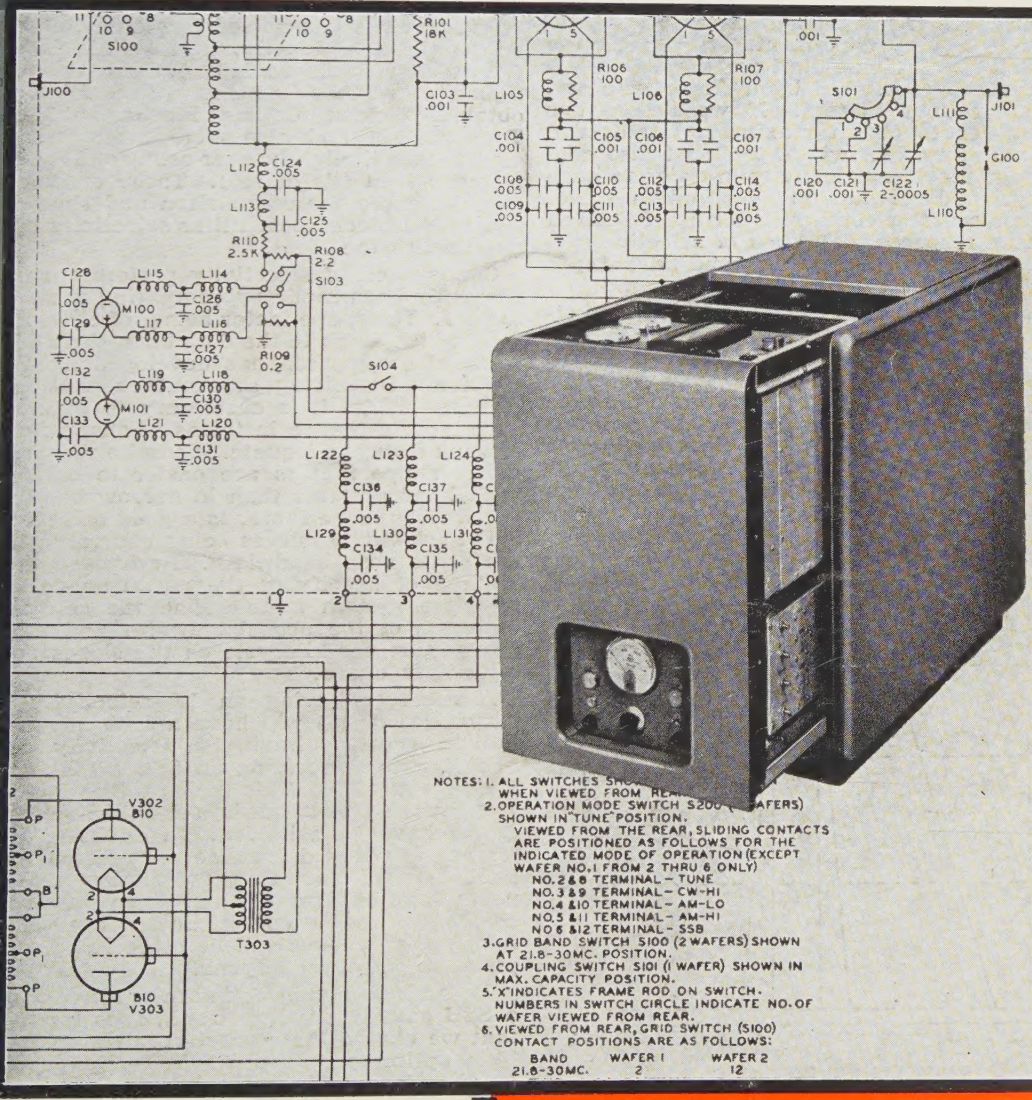
FEBRUARY
1955
35c

CQ RADIO AMATEURS' JOURNAL



NOTES: 1. ALL SWITCHES SHO... WHEN VIEWED FROM REA...
2. OPERATION MODE SWITCH S200 (... AFERS) SHOWN IN TUNE POSITION.
VIEWED FROM THE REAR, SLIDING CONTACTS ARE POSITIONED AS FOLLOWS FOR THE INDICATED MODE OF OPERATION (EXCEPT WAFER NO. 1 FROM 2 THRU 6 ONLY)
NO. 2 & 8 TERMINAL – TUNE
NO. 3 & 9 TERMINAL – CW-HI
NO. 4 & 10 TERMINAL – AM-LO
NO. 5 & 11 TERMINAL – AM-HI
NO 6 & 12 TERMINAL – SSB
3. GRID BAND SWITCH S100 (2 WAFERS) SHOWN AT 21.8-30MC. POSITION.
4. COUPLING SWITCH S101 (1 WAFER) SHOWN IN MAX. CAPACITY POSITION.
5. 'X' INDICATES FRAME ROD ON SWITCH. NUMBERS IN SWITCH CIRCLE INDICATE NO. OF WAFER VIEWED FROM REAR.
6. VIEWED FROM REAR, GRID SWITCH (S100) CONTACT POSITIONS ARE AS FOLLOWS:

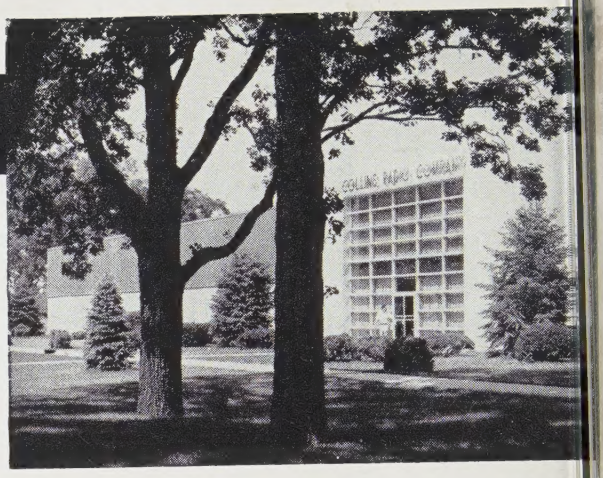
BAND	WAFER 1	WAFER 2
21.8-30MC.	2	12

In This Issue =

Exclusive!

The Story Behind The Johnson Kilowatt

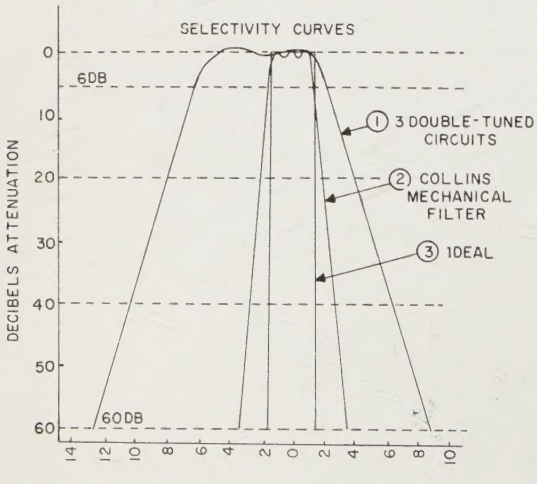
ENGINEERING NOTES



SSB RECEIVER SELECTIVITY

Consideration must be given to the design of the receiving equipment, as well as the transmitting equipment, if we are to realize the advantages offered by a single sideband communications system. If we design our transmitter to obtain maximum intelligence with minimum bandwidth, we must also consider our receiver selectivity in order to keep our system bandwidth at an optimum value. Let us discuss selectivity in terms of desired optimum response, definition of selective systems, methods of comparison and advantages of an integrated system.

For years we have been trying to obtain better and better IF selectivity. Now, perhaps, we should ask ourselves; "What is optimum selectivity?" Let's define it as follows: Optimum receiver selectivity occurs when the nose bandwidth (6 db BW) is wide enough to pass the required intelligence and the skirt bandwidth (60 db BW) is narrow enough to reject an unwanted signal in the adjacent communications channel. Extremely steep skirts on our selectivity curves are required to obtain this o mum passband. Ideally, the ratio of the 6 to 6 db bandwidths would be 1. See curve (3 figure below. This figure shows the selecti obtainable from Collins Mechanical Fi Type 455C-31 and also from three pairs double tuned, slightly over-coupled, IF tra formers (coil Q's of 150). These curves super-imposed for comparison and show h nearly the Mechanical Filter selectivity cu approaches the ideal.



Comparison of selectivity performance generally been made by comparing the sha factors. The shape factor being, of course, ratio of the 60 db to the 6 db bandwidths. T basis of comparison has developed from problem of avoiding adjacent channel int ference. While it is customary to define ceiver performance in terms of shape fact it is not always adequate. It can be shown t better shape factors are easier to obtain wide band systems than in narrow band s tems. The shape factor is a good comparis if the selectivity curves being compared ha the same nose bandwidth. Perhaps a bet method of specifying the performance of selective system is to define the selectiv in terms of the nose bandwidth and the attenuation per kilocycle on the slopes of t selectivity curve.

A receiver having an IF selectivity li curves (2) or (3) will have a 3 db advanta over a receiver having a selectivity cur like (1) when receiving an SSB signal wh bandwidth is 3 kc. This is due to the fact th both the receiver bandwidth and the input noi power have been halved. In addition, inte ference is reduced because the receiver pa band is narrower, thus permitting a larg percentage of clear signals. When the corre bandwidth for a communications circuit fully utilized, there will be more room on t phone bands for everyone.

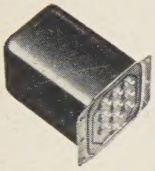
In order to obtain optimum performance a SSB communication circuit, it is importa that we choose the correct receiver respons This optimum selectivity is easily provide by the Collins Mechanical Filter.

CHICAGO STANDARD

MATCHED POWER SUPPLY COMPONENTS FOR EVERY MODERN TRANSMITTER

Dozens of matched power supplies —in a variety of mounting constructions—to fit any need, any budget—are available from Chicago Standard.

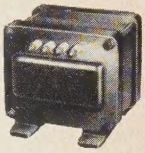
HERE ARE JUST A FEW...



CHICAGO

Type S & SX. Drawn steel case

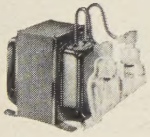
D.C. Volts	DCMA CCS	DCMA ICAS	Plate Transformer	Choke No. 1	Choke No. 2
400/500	250	325	P-45	R-63	R-103
600/750	250	325	P-67	R-63	R-103
1250 and 400	150 200	200 260	P-1240	R-63	R-63 RS-8200 RS-12200



CHICAGO

Type FS. Heavy duty cast frames

D.C. Volts	DCMA CCS	DCMA ICAS	Plate Transformer	Choke No. 1	Choke No. 2
2100/2600	500	700	P-2126	R-65	R-105
2500/3000	500	700	P-3035	R-65	R-105
3000/3500 /4000	600	800	P-4353	R-67	R-67

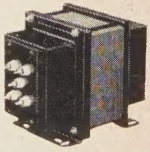


STANCOR

Type PT & C. Plate leads out of top on type PT.

D.C. Volts*	DCMA CCS	DCMA ICAS	Plate Transformer	Choke
1000	225	280	PT-8311	C-1412
1000	325	405	PT-8312	C-1414
1500	225	280	PT-8314	C-1412
1750	200	250	PT-8315	C-1646

*For single-section, reactor-input filter with full-wave mercury-vapor rectification.



STANCOR

Type FS. Formed steel frames with ceramic terminals

D.C. Volts	DCMA CCS	DCMA ICAS	Plate Transformer	Swinging Choke	Filter Choke
1000/1250	300	375	P-8026	C-1403	C-1413
1250/1500	500	625	P-8029	C-1405	C-1415
1750/2000	500	625	P-8033	C-1405	C-1415
2000/2500	500	575	P-8035	C-1405	C-1415

Complete specifications on these and over 1000 other Chicago-Stancor transformers will be found in the Chicago Standard catalogs. FREE from your local distributor.

CHICAGO STANDARD TRANSFORMER CORPORATION

ADDISON AND ELSTON
CHICAGO 18, ILLINOIS

EXPORT SALES: Roburn Agencies, Inc.
431 Greenwich Street, New York, N. Y.

February, 1955
Vol. 11, No. 2

OUR COVER PHOTO

Al Pichitino, WØEDX, and Fred Hager, Jr., WØDRG, key men on the engineering staff at E. F. Johnson Co., have collaborated in bringing you the comprehensive design and performance story on the new Viking Kilowatt, which is featured, complete with photo breakdown, on page 15 of this issue. Our Cover photo illustrates the unit, which can be used as a pedestal for an executive desk, as illustrated on page 15.

CQ

Feature Articles

Departments

Miscellaneous

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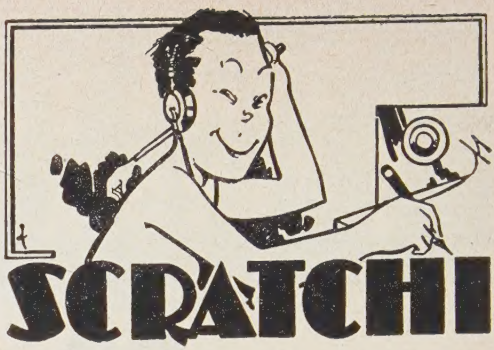


Feenix, Ariz.

Deer Hon. Ed:

Don't reeding this yet!! Quickly, looking over left sholder—nobuddys there? Good, then quicklike looking over rite sholder—nobuddys there? Peechy, then you can proseeding. But, Hon. Ed., being careful, for hevvins sakes, on acct. you holding in your Hon. Hand the gratest idea since Macaroni are discovering wireless. What is it, you asking? Just the about-to-be famus Scratchi 8GDG sistem.

Honest to truly. Scratchi are doing it again. Yes indeedy, old Geenyus Scratchi hitting Hon. Jackpot, and I rushing detales to you so you can skedyuleing 1/c lead article on same. I not having completed artickle on Scratchi 8GDG idea yet, but as soon as are finding out how it working eggsactly I riting you hot-shot artickle. By gollies, when peeples heering abouts this—oh oh, Hee Hee—Scratchi not telling you what it is yet, are I?

Maybe best way to starting is for Scratchi to painting mental pickshure for you. Imagining the Jones family in the Jones house in the living room after dinner. Over in the southeast corner of living room is sitting sooper-dooper BC set. This are like no broadcast reseever you ever putting your eyes on, Hon. Ed. It are broadcast set for hole family.

In southwest corner sitting Mr. Jones in easy chair. He listening to evening news on radio. On sofa in center of room are Mrs. Jones—she listening to soap opera. Next to her are old Grandma Jones, and she listening to Nelson Eddie. In northeast corner are Junior, and he absorbed in radio program about Spacehappy Sam. And, in northwest corner are sitting Sis Jones, who mooning over singing of Eddie Fisher.

Aha—so what, I heer you saying, what are hard about this? Hon. Ed., I doing this with one BC reseever—no earfones—no wires—no nuthing. Let's looking at happy old Jones family again. Mrs. Jones telling Junior to going upstares and studying. So, he going to BC set, turning speeker so it pointing upstares, and upstares he go. When he get to his room, he still heering Spacehappy Sam. Still sounding easy, Hon. Ed? Hah!!!

(Continued on page 6)

hallicrafters

CHICAGO 24, ILLINOIS

40 Meters
7 Mc—7.3 Mc
39.8°—205.2° (165.4°)

15 Meters
20.2 Mc—21.6 Mc
25°—260.5° (235.5°)

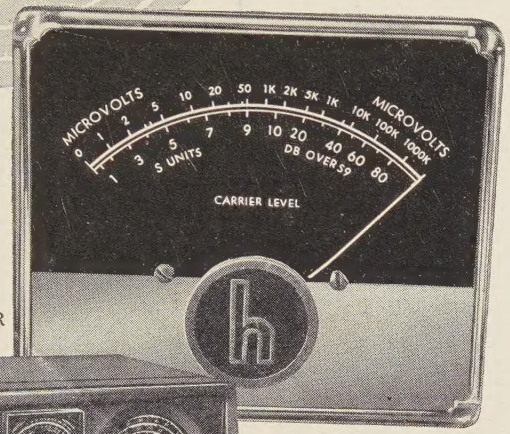
10-11 Meters
26.9 Mc—30 Mc
63.9°—330° (267.9°)

80 Meters
3.5 Mc—4 Mc
16.8°—275° (259.8°)

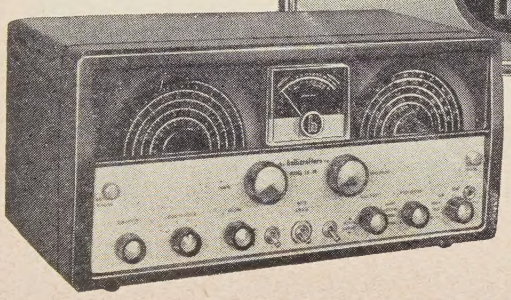
20 Meters
14 Mc—14.4 Mc
20°—249° (224°)

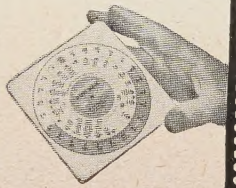
for 1940, Hallicrafters has always been strongly linked with pioneer developments in ham radio. Our fine new line including the SX-99 will cement this relation even further because it reflects 20 years of communications leadership.

Bill Halligan, Jr.



"S" METER





Here is everything you could wish for in a DX receiver. Covers Broadcast Band 540-1680 kc plus three short-wave bands 1680 kc—34 Mc calibrated for the 10, 11, 15, 20, 40 and 80 meter amateur bands over a large easy-to-read dial. Features for the amateur—"S" meter, separate bandspread tuning condenser, crystal filter, antenna trimmer, one r-f, two i-f plus 3.2 and 500 ohm speaker terminals.

Look over the new SX-99 at your jobber or write for specifications—you'll be glad you did.

Gray-black steel cabinet with brushed chrome trim and piano hinge top, 18⅜" x 8½" x 11". Shipping weight 36 lbs.

Seven tubes plus rectifier. 105/125 V. 50/60 cycle AC. $149.95 (less speaker). *Use Hallicrafters R-46A Speaker.*

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SX-96 ☐ SX-99 ☐

Name_____

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(from page 4)

So, okeh, what are Scratchi's 8GDG sistem. It are just Scratchi's Ate Grate Direckshunal Groups. I'll trying to explaining in non-technickel languige.

BC reseever are tuning in all stayshuns on broadcast band at once. It converting these signals to ultra-sonic single sideband. Each stayshun being fed to different loudspeeker. Also, BC reseever are generating ultra-sonic 25 kilocicle note, which are being sent out all over room on one big speeker.

Now, when persons standing in line of speeker which beeming sharp ultra-sonic single sideband signal to him, he also having 25 kc. signal coming to his ears. So, what happening. As everybuddys know, ear are nice peechy non-linear device, so two signals are mixing in Hon. Ear and person are heering the difference freakquency, which are the program being put out by one BC stayshun. Each speeker beeming one program to speshul spot, so to heering program, you just having to go to that spot, or turning speeker to spot where wanting to heer program!

Aren't that a slicky idea? Now normally, Hon. Ed., Scratchi's ideas are sounding good, but you or somebuddys else coming up with needle in woodpile and proving it not working. This time Scratchi are having you deds to rite. I know this skeem are working, on acct. I trying it!

I getting to audio signal generators, and connecting them each to loudspeeker. I setting one generator at 16 kc. and the other at 15 kc. and by gollies I heering nice one kc. note just like Jim Dandy. So, I knowing Scratchi's 8GDG sistem are hots stuff.

Hon. Ed., think what this being in Dee-X contest. Can only having one reseever, but could putting on many, many speekers, each listening to part of band. You can running up and down in front of speekers are listening across hole band but really.

Saving space in early issue of Hon. Mag. and I building 8GDG sistem and riting artickle reel quick-like.

Yours post hastily,
Hashafisti Scratchi

Spare Parts . . .

Club Newspapers

The editors of club newspapers and monthly bulletins are reminded that a reward for their efforts can be had, if they are interested in setting up a reciprocal subscription with *CQ*. The items for these short notes (in the "Monitoring Post") are often obtained from club papers. An interesting bit of news might appear in *CQ*—and who knows—you might get stuck with the job of editing the paper next year. But seriously, we will be glad to swap—what say?

New Heathkit VFO KIT

MODEL VF-1

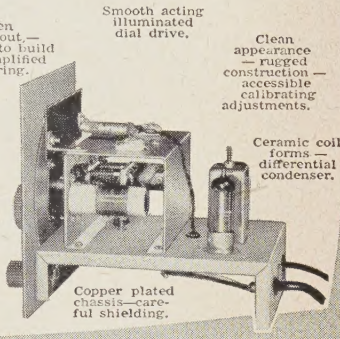
$19.50

Ship. Wt. 7 lbs.

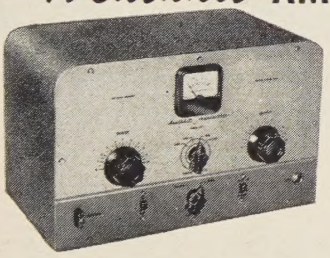
- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.



Heathkit AMATEUR TRANSMITTER KIT



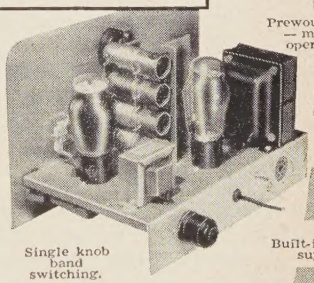
MODEL AT-1

$29.50

Ship. Wt. 16 lbs.

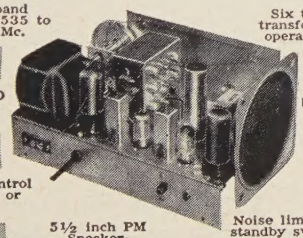
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 .....Oscillator-multiplier.
6L6 .....Amplifier-doubler
5U4G ..... Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.



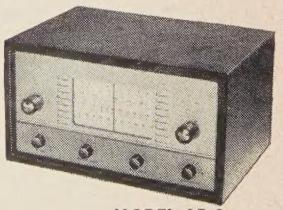
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

Heathkit COMMUNICATIONS RECEIVER KIT



SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 .....Mixer-oscillator
12BA6 .....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6.....Beam power output
5Y3GT .....Rectifier
105-125 volts A.C. 50-60 cycles, 45 watts.



MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

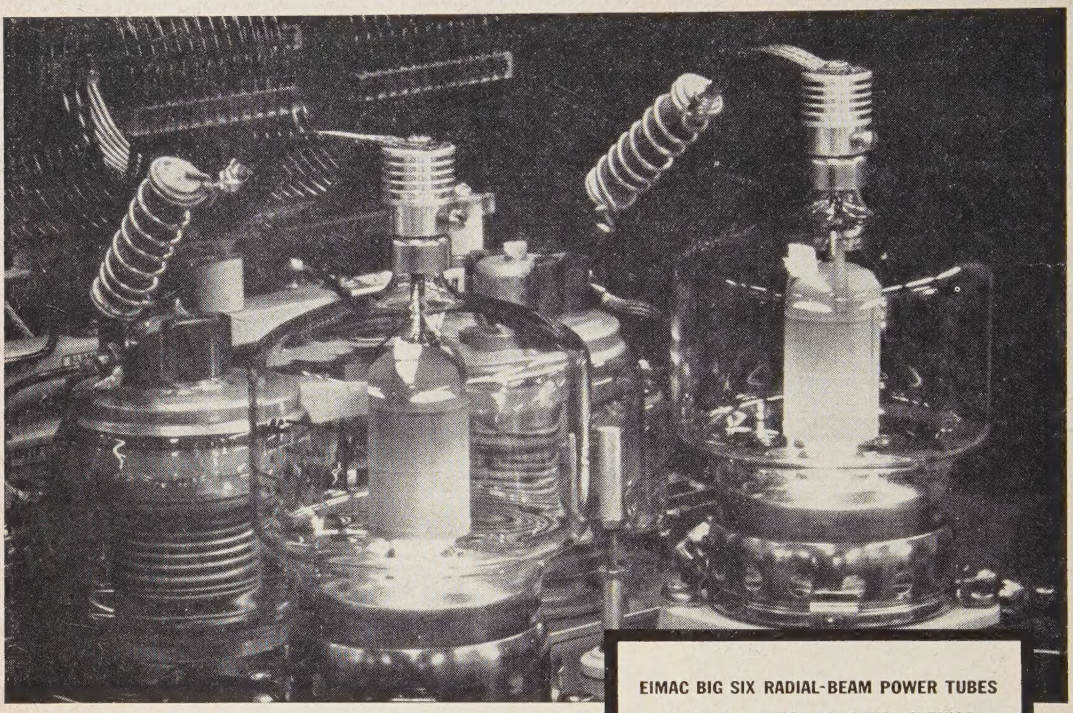
A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

HEATH COMPANY
BENTON HARBOR 12, MICHIGAN

How to select a tube for single sideband



To realize the advantages of Single Sideband operation, there are two important points to keep in mind when selecting a final amplifier tube. First, since there is no continuously running carrier, high peak powers may be reached when a signal is put on the air. And second, because it is easier to produce an SSB signal at a low power level, it takes more than an ordinary tube to build this valuable low power signal from the modulator to high power in a single amplifier stage. Eimac tubes offer these extras. Their reserve supply of filament emission, lack of internal insulators and widely recognized ability to handle high peak power has been proved over the years. And high power gain is inherent in all Eimac multi-grid tubes. When planning or building an SSB rig, remember these two important points and consider the Big Six of Amateur Radio—Eimac 4-65A, 4-125A, 4-250A, 4-400A and 4X150A radial-beam power tetrodes and the 4E27A radial-beam power pentode.

EIMAC BIG SIX RADIAL-BEAM POWER TUBES

CLASS AB_1 LINEAR AMPLIFIER SERVICE

Typical Two Tone Performance*

	DC Plate Voltage	DC Screen Voltage	Peak Sig RF Grid Driving Voltage	Peak Sig Plate Power Input
4-65A	2000	450	100	195
4-125A	2500	555	100	300
4-250A	3000	600	110	630
4-400A	3000	810	140	900
4X150A	1250	375	60	350
4E27A	2500	600	110	325

*Permitting safe adjustment and conservative operation.

You can be sure of Eimac quality by asking your distributor for Eimac—the mark of excellence in electron-power tubes for over 20 years.

Just off the press—"Application Bulletin No. 9," giving more advice on AB_1 Linear Amplifier design for Single Sideband. Write our Amateurs Service Bureau for a free copy.

Eimac

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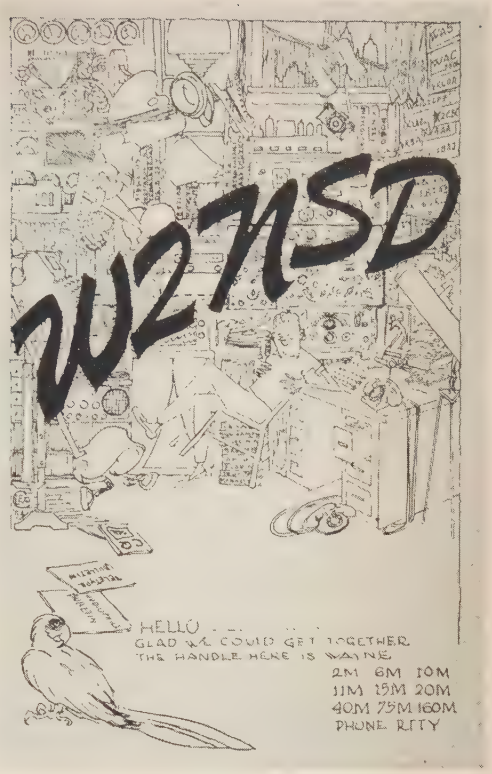

Wayne Green, W2NSD

Those of you that happen to read some of this stuff way up here in the front of the magazine are now in a good position to find out that starting with the March issue, *CQ* will have a new editor: me. Not much change except for that.

Might be you would'st know more about me. Waal, for one thing I'd like to point out that my hamshack has been a well known Brooklyn showplace for several years. Local hams bring their wives to my cellar and say, "See, honey, and you thought I had a mess at home!" Even out-of-towners turn up now and then to see my cellar having heard about it over the air. A dubious distinction, I suppose, but it does feel nice to get recognition.

I've worked a lot of 10-20 & 75 phone, am approaching DXCC (verry slooowly), been pretty active on two and six meters, won the local awards several times in the SS Contests, and get on pretty frequently with my mobile rig. One of my pets has been RTTY and I have used that on two, six, eleven and eighty meters. I'm very interested in SSB, ham TV and FAX, esoteric though they may be.

W2NSD has been licensed since 1941. Mostly inhabited 160M befo de wah. Reduced J QRM from the safe cozy confines of a submarine while masquerading as a radio technician. Since the war has been active on all bands from two through one sixty. Started in RTTY in 1948 and is still going strong with it.

Having engaged in so many different phases of amateur radio I have found, as many of you have, that each phase is a sort of world in itself. In the interests of bringing more fun to us all I hope to bring you articles that will explore these facets of our hobby.

The wonderful social benefits of our hobby are seldom appreciated by us, but when you consider what an important place ham radio plays in the life of the physically handicapped, people who are retired, people who are new in a community, and just about everyone else, you can begin to understand. Most of us know some deaf or blind amateurs and realize how important amateur radio is to them.

Amateur radio has held top place in my life for a long time now. As editor of *CQ* I will try to bring you the things you ask for and humbly beg your aid and help: let me know what you like and don't like.

MR. NOVICE

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20-meter DX with a 2-element Beam

William I. Orr, W6SAI

Assistant Editor

There's no doubt about it. The sunspot cycle is increasing and DX conditions are getting better and better. European stations are being heard on the west coast of W-land over the long (VK) path in the early mornings—a sure sign that "things are looking up." Such rare prefixes as ZD6, VQ8, FB8 and the like are starting to put signals into all parts of the U.S.A. Like bears coming out of a long winter's sleep, some of the big DX-guns are starting to climb out of bed at 6 a.m. to scan the bands for some juicy DX. The beams are coming out of mothballs, all the war-weary 3000-volt filter condensers (long covered with dust in the surplus bins) are being snapped up. Yessir, the signs are pointing to another big DX season.

Is the big DX "wheel" the only man noticing these unmistakable signs? No, little Joe Ham with his folded dipole and 120-watt rig is aware of the coming DX-feast. He, too, is waiting with anticipation for those elusive AC3's and XZ's. Poor little Joe! Guess what will happen to little Joe, dear reader, when he calls the XZ along with ten or twelve DX-minded hams all of whom are running a full gallon into rotary beams 70-feet high? You are so right. Little Joe will go back to exchanging "handles" with the nearest W9. He just doesn't have a chance.

A word to the wise should be sufficient. With over 120,000 licensed W-hams, it is a good bet that at least half of them will be scanning the DX bands along with Little Joe and his 120 watts and folded dipole. Little Joe, heed well! The only way to work DX is to be LOUD! Little Joe, what you need is a two-element close-spaced parasitic beam to take the place of that folded dipole!

(*A two-element beam? How naive! Don't you know that all the real DX men use three-element 20-meter beams with 24-foot booms?*—**Ed.**) Perhaps so. But here is one DX man that uses a two-element beam. W6SAI may not be at the top of the honor roll of WAZ, but at least he is not crowding the bottom of the list.

The little array to be described has proven its punch in numerous pile-ups and brawls and has come out on top with some choice DX-items. On signal strength checks in Australia, Europe and Africa the difference in performance between the "little wonder" and some of the best 3-element wide-spaced beams in the area has been indistinguishable. This is not to say that a 2-element beam is equal to a 3-element array. The DX gain of the little 2-element array over a dipole is about 5 db. The DX gain of a 3-element wide spaced beam is about 8 db. The

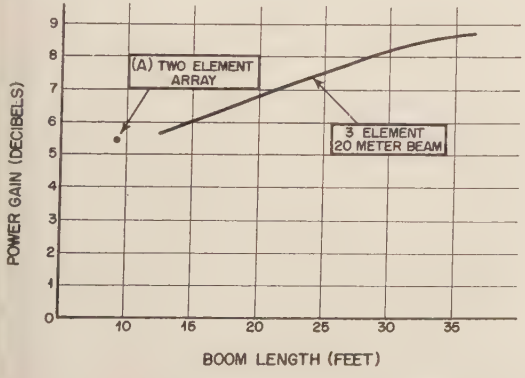


Fig. 1. This is the approximate relationship between overall boom length and the power gain expected from a 3-element beam. The gain of a close-spaced 2-element beam is shown "A."

2-element beam has a boom length of less than nine feet for 20 meters, and the 3-element beam has a boom length of 24 feet. Quite a difference!

Figure 1 tells the story. It has been well established by several independent sources that the power gain of a 3-element beam is proportional to the spacing between the elements, and hence proportional to the total length of the supporting boom. Maximum gain for a 3-element array occurs at an element spacing of 0.25 wavelength. A gain of about 8.5 db. is obtained. On 20 meters, this means an overall supporting boom length of 35 feet. The gain drops slowly as the spacing of the elements (and the boom length) is decreased until at 0.1 spacing (using a 14′ boom) the gain figure has dropped to 6 db.

Most 3-element beams use a 24′ boom length, and the power gain of such an array is about 7.5 db. (Individuals claiming more gain for their 3-element beams than the above figures should be viewed with amusement, if not amazement).

Now, let's look at the "little wonder" two-element beam. If the two elements are spaced 0.12 wavelength apart, and the parasitic element is used as a director, a power gain of slightly over 5 db. may be obtained. This is only 1 db. less than a 3-element beam using a 14′ boom, and only 2.5 db. less than a 3-element beam using a 24′ boom. How important is this drop in signal strength of 2.5 db. compared with the tremendous advantage of using a short, eight-foot supporting boom?

Let's pause a moment and indulge in some investigation of this interesting point:

One day, a few years ago, the writer and W6VAT (now W4EFJ) conducted some tests. W6VAT was equipped with a variable auto-transformer in the primary circuit of his transmitter high-voltage supply and was able to run his input from zero to 700 watts at will. W6SAI took the antenna off his trusty receiver and put in its place a small bit of wire, pruned until W6VAT was about *S7* when running full input. W6VAT thereupon sent various test signals at different power levels, and the signal strength was noted at W6SAI. The tests were conducted

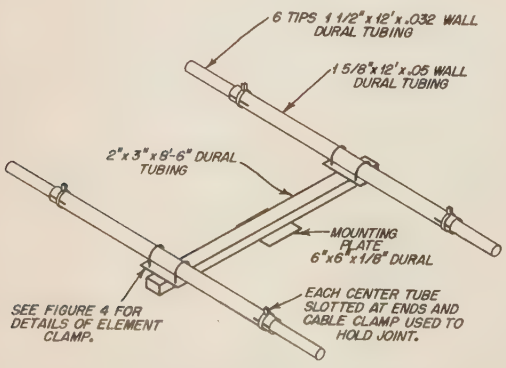


Fig. 3. General working view of the 2-element parasitic beam.

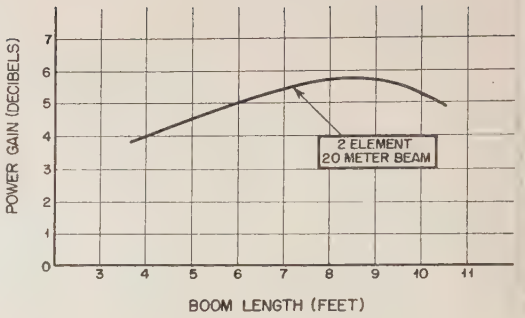


Fig. 2. Typical gain figures for a 2-element parasitic array (director and radiator) tuned for maximum "on-the-nose."

on c.w. no *S*-meter being used, to duplicate actual conditions found when working DX. It was found that the absolute minimum change in power that could be accurately noted was 3 db. (A power change of 2). Changes of power less than this were not noticeable, no matter whether W6VAT was *S2* or *S9*. This information was duly noted in the station log book. The idea of trying a 2-element beam was born as the result of these tests. If a variance of 3 db. was allowable, why not deliberately drop 2.5 db. or so, and use a compact beam that would not give the neighbors high blood presure when it was erected?

A Practical 2-Element Parasitic Array

The maximum power gain obtainable from one parasitic element is obtained when this element is acting as a director. Under these conditions, the parasitic element is slightly shorter than the normal resonant length, and is spaced about 0.12 wavelength away from the driven element of the beam. A gain vs. element spacing for a beam of this type is shown in *Fig. 2*. An element spacing of 8½′ for the 20-meter band is just about optimum for maximum forward gain. The front-to-back ratio of a beam of this type is of the order of 10 db. The front-to-back ratio of a good 3-element beam is about 25 db. However, very few signals arrive directly at the "back" of the beam. Local ground-wave signals may do that, but the usual 1200 to 1500 mile distant "local" QRM that is so bothersome on DX contacts is usually high angle skip that arrives at an angle of 30 to 40 degrees. The discrimination of a two-element beam to signals arriving at such an angle is comparable to the discrimination of the larger 3-element array. Thus while the smaller beam may not offer as much rejection to ground wave signals arriving from the rear, it does a very respectable job on rejection of high angle signals that sneak up behind it.

Armed with this information, a 2-element parasitic array was built and placed in operation on the 20-meter band. The results were so gratifying, that this little story is the result. This antenna may be the answer to your problem.

Construction

The 2-element array is shown in *Fig. 3*. The boom consists of an 8½′ length of rectangular dural tube, measuring 2x3″ in cross section, and having a wall thickness of 0.064.″ A boom as short as this requires no top guys or bracing to hold it steady. Another local ham, making a "Chinese copy" of the beam, used a section of round, 2″ steel TV mast for the boom. It worked just as well as the rectangular dural tube, and was a lot cheaper.

The two elements are composed of 6 pieces of 12-foot dural tubing, 3 pieces to each element. The center sections are 1⅝″ diameter, with an 0.050″ wall, and the tips are made of 1½″ diameter material, with an 0.032″ wall. The elements may be made of either *24ST* or *52ST* dural. Because of the sky-rocketing surplus prices of dural tubing, it is almost as inexpensive to buy new, clean pieces of tubing from a large metal supply house than it is to buy beat-up surplus tubing at the junkyard!

During a series of preliminary tests on this antenna the two elements were insulated from the boom, with a switching arrangement allowing either element to be grounded to the boom.

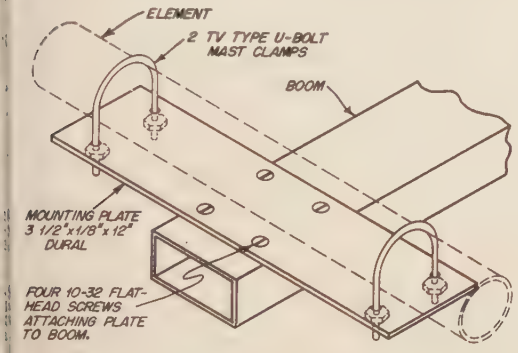


Fig. 4. Detail of the metal plate and clamps that hold the elements to the boom.

t was found that if a metal boom was used, it vas imperative to ground the elements to the oom. A simple mounting was made from a late of dural and two TV mast clamps that vould hold the elements securely to the boom. his assembly is shown in *Fig. 4*.

If a wooden boom (such as a length of 3x4″ umber) is used, the elements need not be conected (grounded). The director is left "floatng" in this case. A metal boom is recommendd, however, as it aids greatly in making a mehanically rugged structure.

Element Lengths

The response of the 2-element beam is broad nough to cover the whole 350 kilocycles of the 0-meter band. However, the elements should e set for lowest standing wave ratio on the

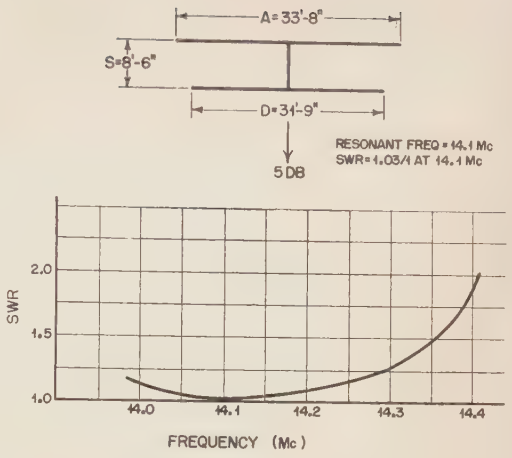


Fig. 5. Dimensions and gain figures for a 2-element beam tuned for optimum performance in the CW portion of the 20-meter band.

transmission line for that portion of the band in which the operator has the greatest interest. Since W6SAI was primarily interested in CW operation, the beam was cut to 14,100 kc. as shown in *Fig. 5*. For phone operation, the beam should be cut as shown in *Fig. 6*. In either case, the operation of the beam is identical. The SWR curve is merely shifted back and forth from the CW portion of the band to the phone band. In practice, no operational difference has been found when operating the beam several hundred kilocycles from the point of resonance.

The Feed System

The feed impedance of the antenna is very close to 16 ohms. The beam may be fed with a 300-ohm line, and 72 ohm matching transformer as shown in *Fig. 7*, or a coaxial line and

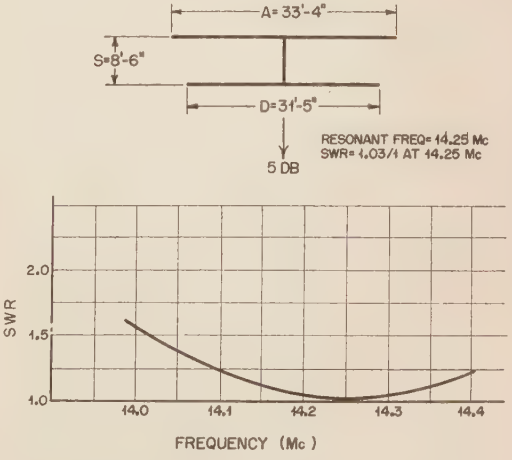


Fig. 6. Dimensions and gain figures for a 2-element beam tuned for optimum performance in the phone portion of the 20-meter band.

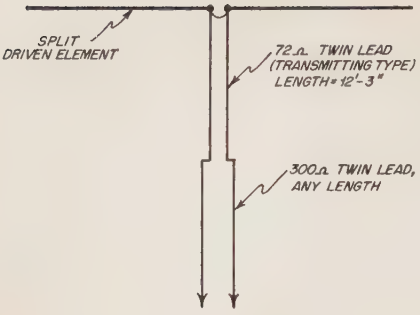


Fig. 7. It is possible to use twin-lead as the feed-line for the 2-element beam. This drawing illustrates the method of a cutting short length of twin-lead to serve as a quarter-wave matching transformer. This method of feed is useful when a balanced system is called for.

gamma match may be used. Personally, I feel that the open wire line is to be frowned upon, since it is necessary to split the element to feed it with a matching transformer. This entails a lot of work and numerous difficulties of a mechanical nature. One way around this problem is to match the 300-ohm line to the driven element of the beam with a T-match.[1]

However, the coaxial feed system and pi-network tank circuit have become extremely popular in the last few years, and this arrangement is recommended over all others. A suitable gamma match for 52-ohm coaxial line is shown in *Fig. 8*.

Gamma Adjustments

If the antenna is set to the measurements given in *Figs. 5 and 6* there are no real "antenna" adjustments. The two adjustments to be made are the setting of the gamma condenser, and the correct length of the gamma rod. If the dimensions of the gamma rod specified in *Fig. 8* are followed, the setting of the gamma may be considered to be correct. The one remaining adjustment is the gamma tuning condenser. A standing wave meter, such as shown in *Fig. 9* is needed. This instrument should be placed in series with the coaxial line to the antenna, and then this procedure followed:

1. Attach the SWR meter to your exciter and supply one or two watts of power to the SWR meter—enough to cause a full scale reading on the meter. In many cases, a grid-dip oscillator will deliver sufficient power for full scale reading of the SWR meter.
2. Attach the output terminal of the SWR meter to the coaxial line of the beam antenna. Note how far the meter drops back from full scale reading when the antenna line is connected to the meter.
3. Have an eager assistant slowly rotate the gamma condenser for lowest reading on the SWR meter. If the meter reading can be brought down to 0.1, or less, of the full-scale meter reading, the antenna may be assumed to be tuned in a satisfactory manner.
4. The frequency of the grid-dip oscillator or exciter should be varied across the 20-meter band. The point of lowest SWR is the resonant frequency of the antenna system. This point of lowest SWR may be varied several hundred kilocycles by the setting of the gamma condenser. It is not necessary to change element lengths of the antenna to position the resonant frequency in the amateur band.
5. If it is not possible to obtain a minimum resonant reading of 0.1 of full scale reading on the SWR meter by rotation of the gamma condenser, the length of the gamma rod should be changed slightly, 2" at a time. After each change, a new SWR reading should be taken after the gamma condenser is re-resonated. It is suggested that the rod be lengthened at first, rather than shortened.
6. Several duplicate beams have been built to the above pre-cut dimensions and have all performed in fine style. If your beam is located in a reasonably clear area, these dimensions will probably work as-is for you. Try and stay clear of overhead power lines, tin garage roofs and the like. If a nearby powerline cannot be avoided, position the beam either above or beneath the line. Locating the beam in the same horizontal plane as a nearby power line is the best way of funneling your signal into the nearby TV sets that I know of!

(Continued on page 58)

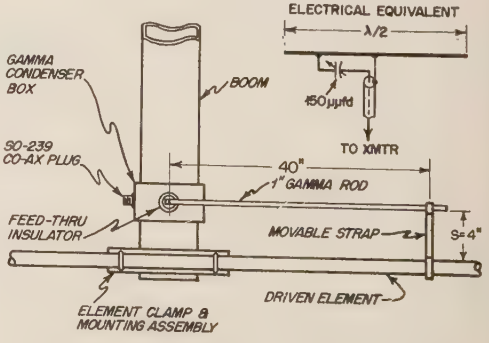


Fig. 8. This is a mechanical drawing of a possible gamma matching assembly. A small metal utility box houses the 150 μμfd. double-spaced tuning condenser. The box must be sealed at the seams with "roofing compound." The gamma condenser is mounted on ceramic stand-off insulators. A quarter-inch hole in the side of the box allows the slotted shaft of the condenser to be tuned with an insulated screwdriver. The gamma rod is attached to the box by a 1½-inch high feed-thru insulator. A coaxial cable connector is mounted on the end of the box and then the box is securely grounded to the metal boom.

1. "The Terrible T, and Gamma, Too," William I. Orr, W6SAI, *CQ*, October, 1953, page 15.

Viking

A. M. Pichitino, WØEDX

F. M. Hager, WØDRG

kilowatt

The "Viking Kilowatt" represents a new concept in the design of communication transmitter equipment. Uniquely styled and packaged, extremely compact yet setting a new high for ease of accessibility, efficient and flexible, its features will be of interest to many amateurs.

For some time, we had believed that transmitter construction as used for the past 30 years—vertical relay rack or cabinets—was old-fashioned, of poor general appearance and left much to be desired in terms of operating ease, particularly in amateur work where frequent band changing is a rule rather than exception. It is our conviction that all operating controls should be conveniently within reach of the operator in the seated operating position. Modern styling and exceptional operating ease, therefore, became one of our primary design objectives.

Other major design objectives were:

1) One switch selection of maximum legal power, 1000 watts input, on SSB, CW or AM, with low power provision.
2) Extreme stability, particularly in the r-f amplifier.
3) Complete TVI suppression.
4) Wide range output coupling circuitry.
5) Quick and easy accessibility.
6) Rigorous safety and protective provisions.
7) Bandswitching, continuous coverage 3.5 to 30 megacycles.
8) Conservatively operated tubes and components.
9) Low r.f. and audio drive requirements.
10) Low cost.

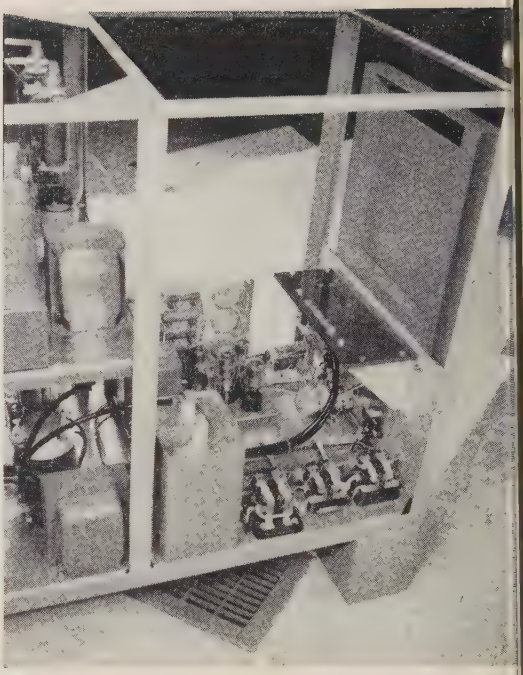
All of the design objectives were reached successfully in the *Viking Kilowatt*.

Styling and General Construction

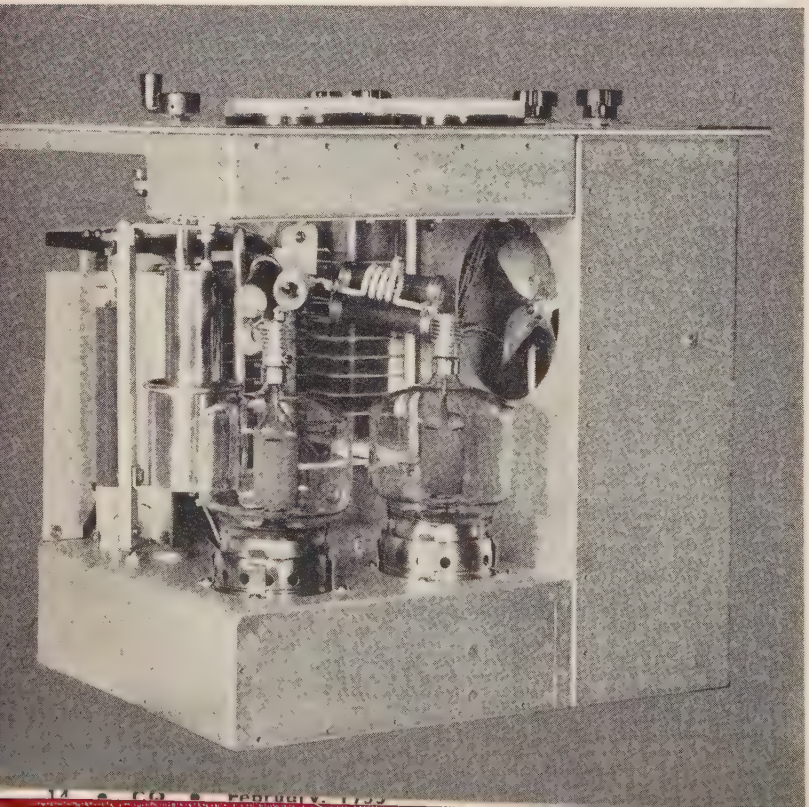
The title photo illustrates the general styling of the equipment. The complete 1000-watt unit; r-f power amplifier; high-level class B modulator; plate, screen and bias power supplies; control relays and circuitry; is housed within a streamlined desk-high steel pedestal only 29½" high, 19¾" wide and 32⅞" deep. Provision is made for the attachment of an accessory executive-type desk top and drawer assembly to either side of the equipment pedestal thus providing an integrated operating desk. The r-f amplifier controls and meters (including modulator current) are on the top of the pedestal at the operator's fingertips with the meters at an angle to provide direct viewing when seated. An ⅛-inch protective cover plate is supplied which nests on top of this control area (flush with the top of the pedestal) when the equipment is not in use. A thin slot, at the right side of the control area, equipped with channel guides and spring loaded, serves as a storage cavity for the cover during operation. A touch of the finger release and the cover springs upward for grasping.

The small control area at the lower front of the pedestal contains the less frequently used controls such as filament switch, overload reset, fuses, pilot lights, plate voltmeter and transmission mode switch. A hidden, sliding door may be pulled down over the area for protection when the equipment is not in use.

A rectangular frame of heavy steel angle contains all of the components and mounts the front panel of the pedestal. This frame slides

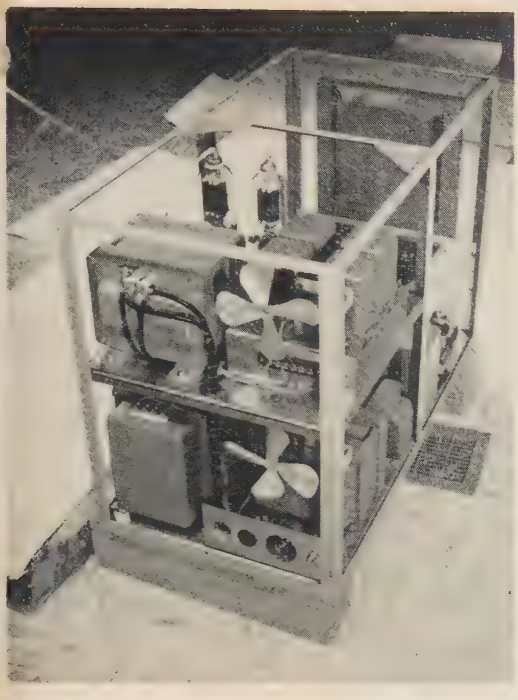


Equipment frame showing control relays, voltage regulator chassis, mode switch and amplifier plug-in power receptacle. Plug-in r-f power amplifier removed.



R-f amplifier, right s showing 4-250A tubes, cooling fan and tank c ponents. Shielded m compartment is at top.

cover



Upper deck contains modulator and bias and screen voltage sub-chassis. Lower deck shows plate transformer and power receptacles. Note intake and exhaust cooling fans.

into the pedestal enclosure on ball-bearing rollers. When assembled, the removal of only two thumb screws and three quick-disconnect plugs permits instant withdrawal of the frame for extraordinary accessibility.

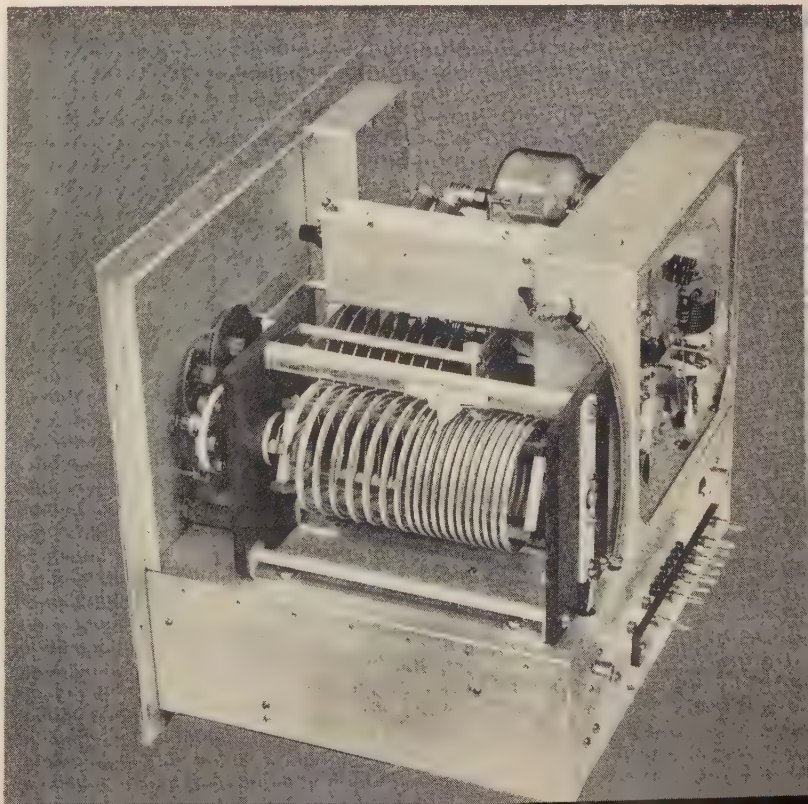
The pedestal is finished in a soft metalic gray which is compatible with any decor.

R. F. Power Amplifier

The power amplifier employs two 4-250A tubes in parallel, bridge-neutralized, operating conservatively at 2500 volts. A pi-network plate circuit uses a heavy duty rotary inductor which is geared to the tank capacitor for single control tuning. A wide range output circuit matches nominal 50 to 500-ohm loads with the additional capability of tuning out large load reactances. The amplifier is a completely shielded *plug-in-unit* with all external leads thoroughly filtered. Two blowers within the amplifier cool filament and plate seals for extended tube life. Frequency coverage is continuous 3.5 to 30 Mc.—no coil changing. Driving power is less than 30 watts CW-AM and 3 watts peak SSB.

Class B Plate Modulator

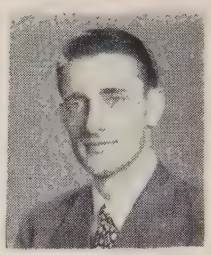
A high-level plate modulator is employed with push-pull 810 tubes in class B. It has plate saturation limiting to reduce overmodulation. The modulator is always energized so that static current, plus that of the heavy duty power supply bleeder, improves the regulation of the high-voltage power supply. A relay shorts the modulator grids and



amplifier, left side, show- heavy-duty rotary plate ductor geared to plate ca- citor. Power plug strip grid circuit sub-chassis t right .

WØDRG has been an active amateur since 1927. He holds an Advanced class license and WAC. Fred's favorite bands are 20 and 40 with DX taking the biggest part of the interest. Fred holds down the position of Senior Radio Engineer at the E. F. Johnson Co.

WØEDX has had the pasteboard since 1931 and is also an Advanced ticket holder. Al has had several National SS awards and DX honors. His favorite bands are 10, 20, 40 and 75, plus mobile. Al's position is Chief Engineer at the E. F. Johnson Co.



modulation transformer on CW and SSB. The audio response is better than plus or minus 1 db. 200-3500 cps. Driving power required is less than 15 watts.

Power Supplies

The high-voltage power supply has an output of 2500 volts at better than 700 ma. and utilizes 872A rectifiers. To improve voltage regulation on SSB, a single-section filter is employed which in conjunction with the bleeder and modulator currents results in excellent voltage regulation.

The screen supply uses VR tubes for AM and SSB operation and a 5R4GY rectifier.

The bias supply is heavily bled (150 ma.) for good regulation. Individual bias potentiometers are used for initially setting modulator and SSB bias. Bias, screen and filaments transformers are fused at the front panel.

Primary power is 210-240 volts a.c., 50-60 cps, single phase.

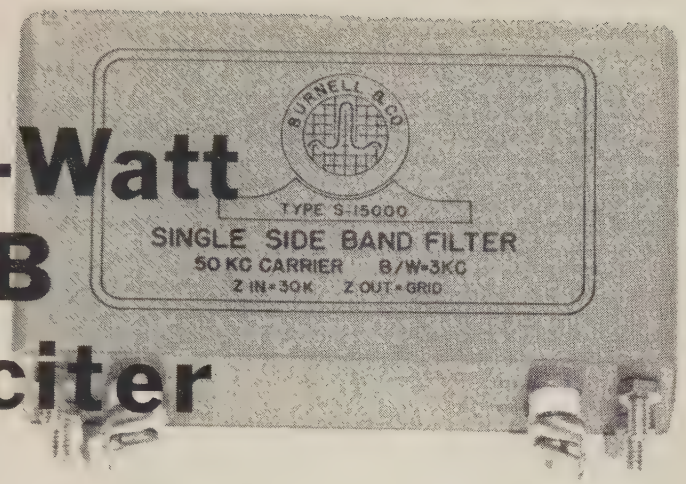
Transmission Mode Switch

The *Mode* switch has five positions: *SSB, AM-HI, AM-LO, CW-HI* and *Tune*. The *SSB* and *HI* positions provide 1000 watts input power while the *LO* and *Tune* (same as *CW-LO*) positions provide approximately 250 watts. This switch shifts bias, screen and plate potentials as required for the desired transmission mode and in addition shorts both the modulator grid and transformer secondary circuits on SSB and CW by means of a relay.

Top view of amplifier control area. Note angled meters for direct viewing from operating position.

Power control panel with protective cover in raised position.

A 75-Watt SSB Exciter



Jack N. Brown, W3SHY

Contributing Editor

Part II of a Two Part Story

In the first part of this story (January issue), the author detailed the operation of the circuit and showed the complete wiring schematic. *Figure 3* shows a suggested mechanical lay-out for this exciter. Any reasonable lay-out arrangement may be used as long as good engineering practices are followed — such as isolation of input and output circuits, etc.

At first it was thought that a shield between the input and output terminals of the *Burnell* filter would be necessary, but it was found in practice that it was not required. The large inter-stage shield between the last two stages of the transmitter is necessary to reduce the coupling between the 6146 plate tank and the 2E26 plate tank. Short direct leads are always called for whenever r-f signal voltages are being carried. Direct single-point bypassing is also desirable with either tubular or disc ceramic type capacitors.

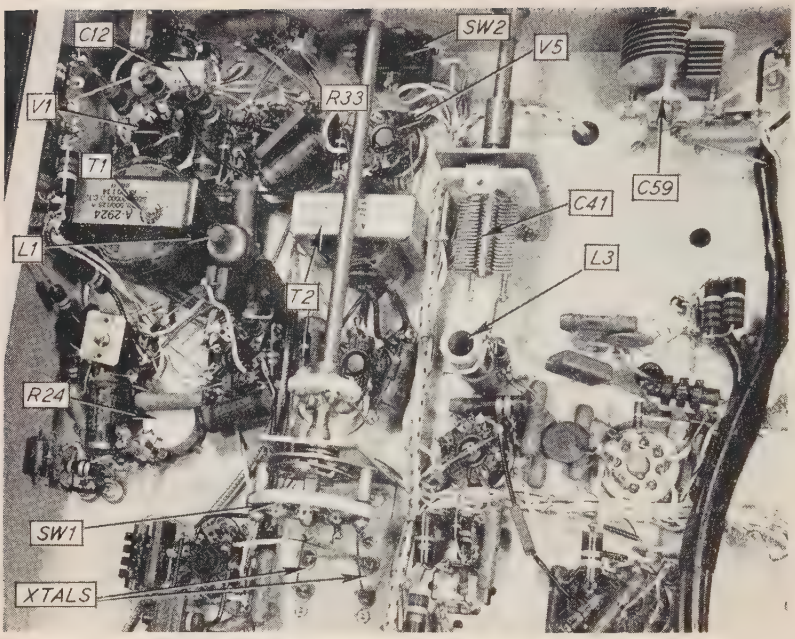
One item that the author suggests as a change from that shown in the photographs is to place *T1* above the chassis instead of below the chassis. This will eliminate some of the speech amplifier area crowding evident in the under-side views of the chassis. The transformer may be mounted directly above its present position on the same mounting holes.

Alignment

The first step in the alignment procedure is to determine if the speech signal is clean and free of hum. Use a pair of high impedance phones in series with a 0.1 μfd, condenser and monitor the signal across *R21*, the cathode load resistor for *V2a*. In the test model built by the author, an intermittent crackling noise was heard and was tracked down to a defective cathode bypass condenser, *C13*. Watch for symptoms of this nature in checking through the unit.

Next the 50-kc. oscillator must be aligned to frequency. With a vacuum-tube voltmeter connected across the cathode resistor of the oscillator, *R31* determine if the oscillator is functioning. If it is performing properly the r-f voltage across this resistor should be between 30 and 60 volts rms. Couple a BC-221 frequency meter loosely to the cathode terminal of *V3b*, the cathode-follower carrier-insertion stage. This permits coupling to the frequency meter without loading the oscillator and changing its frequency. Since the low-frequency range of the BC-221 does not go below 125 kc., the third harmonic of the 50-kc. oscillator must be aligned with the 150-kc. point on the frequency meter. It is best if the next harmonic is also checked against the 200-kc. calibration point of the frequency meter just to make sure that some stray harmonic combination is not confusing the alignment. Once the frequency is aligned no further adjustment of the oscillator slug should be necessary.

The r-f voltage from each side of the balance-potentiometer *R24*, should be between 2 and 5 volts rms. The position of the potentiometer



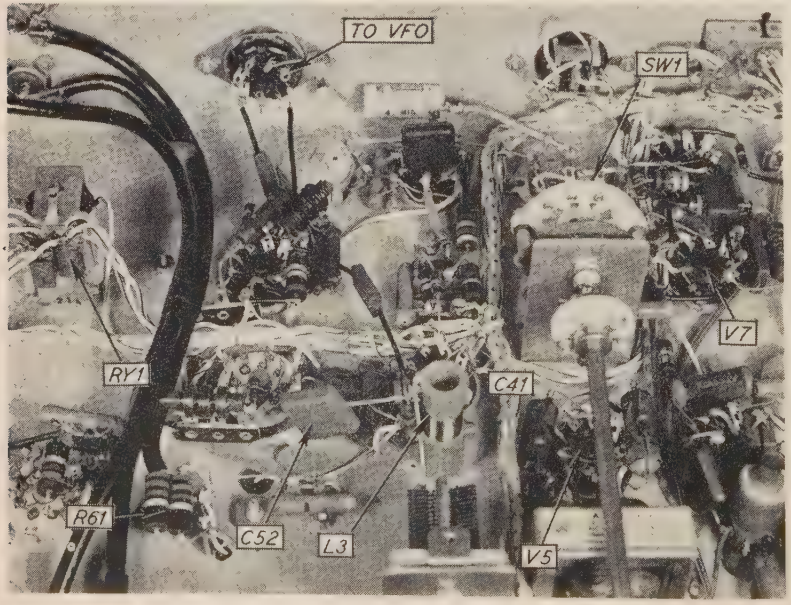
This is a view of the Burnell SSB exciter showing the component arrangement surrounding the low-level stage and the speech amplifier.

arm will have a bearing on the reading. When it comes time to balance out the 50-kc. carrier signal it may be necessary to add a capacitive balance condenser from one end of the balance control, *R24*, to ground. A 100 $\mu\mu$fd. compression mica trimmer was found adequate in this model. A balance condenser may not be necessary at all, so none is shown on the schematic. The balance potentiometer and balance condenser (if used) should be adjusted alternately until a satisfactory balance is obtained. This may be observed more readily at the output of the i-f amplifier, *V9*, at the 450-kilocycle frequency.

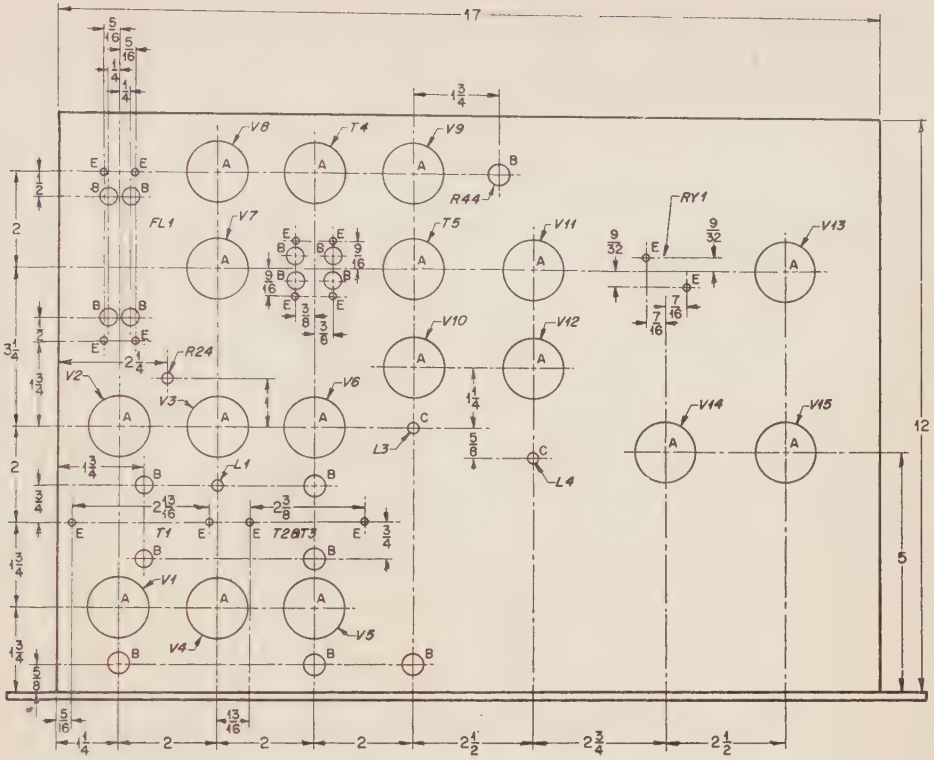
Next determine if the low-frequency crystal oscillator is operating. Observe the frequencies of the two-crystals by measuring them with the BC-221. As pointed out earlier, these frequencies should be exactly 100 kilocycles apart. If the oscillator is not functioning for either crystal, make a change in the value of *C31* or *C32* and again test for oscillation.

The r-f voltage present at *pin #5* of *V8* should be 10 volts rms and should be set by adjusting the size of the oscillator coupling condenser, *C29*.

Couple the BC-221 lightly to *pin #4* of *V9* and set the frequency meter dial for 450 kc.



Under chassis view looking towards the rear skirt of the exciter unit. Note the relationship of the switch, Sw1, in this photo and the one above.



Dimensions and layout of the chassis of the Burnell SSB exciter. As mentioned in the first part of this story, the constructor is not obligated to build the complete unit. Instead he may wire in the essential stages and add refinements (VOX, carrier re-insertion, etc.) later.

and peak the slugs of *T4* for a maximum signal when the carrier insertion control, *R33* is advanced slightly. This peaking operation should be definite and without trouble or guess-work.

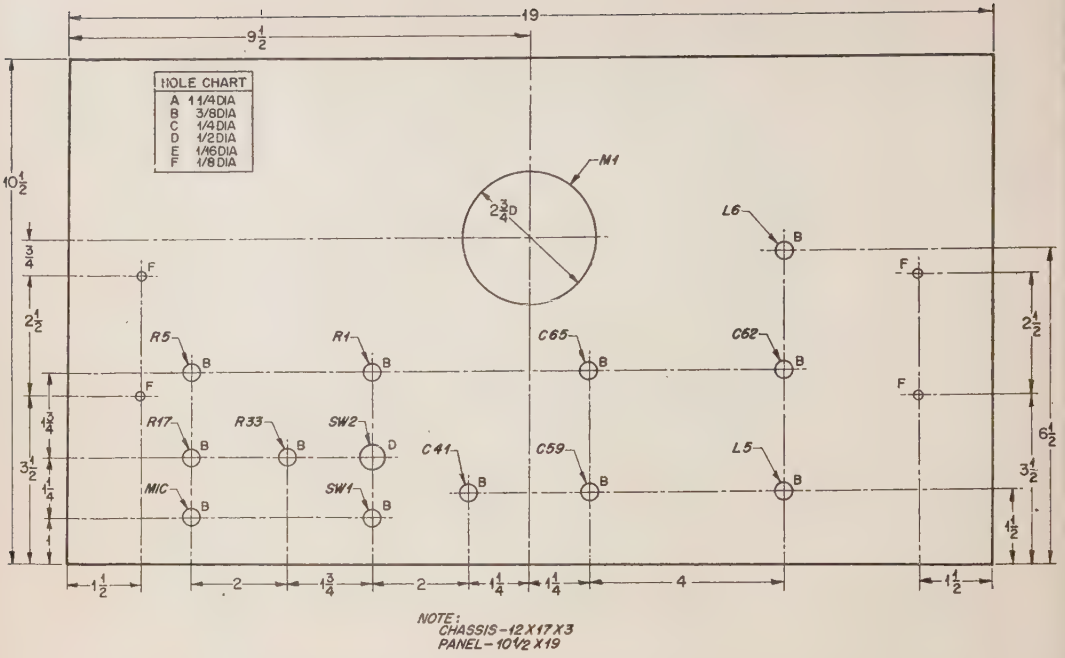
Next transfer the BC-221 pick-up wire to *pin #8* of *V10* and adjust the slugs of *T5* for a peaked condition. Go back and readjust the slugs of *T4* again. Carefully check the i-f amplifier, *V9*, for any signs of self-oscillation or signal-frequency instability.

The preceding steps can be made without regard to the position of the voice control switch, *Sw2*. However, the following steps should be made with *Sw2* in the "OFF" position. The 6146 and 2E26 tubes should be removed from their tube sockets until needed in later steps.

The 450-kc. signal voltage appearing at *pin #8* of *V10* should not be over 0.5 volts peak. The oscillator injection voltage at *pin #5* of *V10* should be 10 volts rms.

The v.f.o. should now be adjusted so that the bandspread condenser, *C45*, tunes the v.f.o. through the frequency range of 3350 to 3550 kilocycles with some lap-over on each end. The band-set condenser, *C44*, must be adjusted so that this condition exists. With the oscillator frequency set near 3550 kilocycles, insert carrier by advancing *R33*, tune the station receiver to 4.0 Mc. and find the "sum-mixture" of the 450-kc. SSB signal and the v-f-o signal. Peak the signal using condenser *C41*. Next tune the v.f.o. so that the SSB signal is at the 3800-kc. end of the phone band, set *C41* near maximum capacity, and adjust the slug in coil *L3* for a maximum signal. This prevents the mixer tuned circuit from tuning to the v-f-o signal frequency.

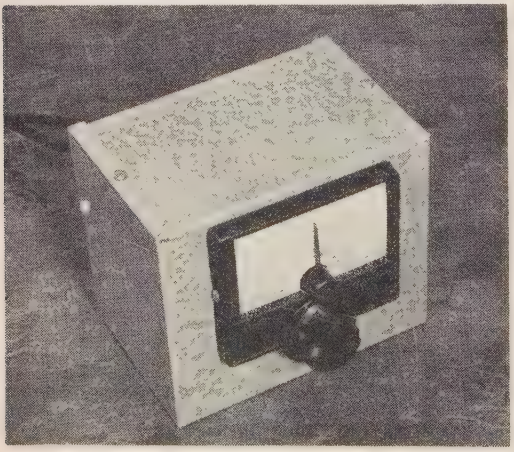
Next, plug the 2E26 tube into its socket and connect the terminals of the r-f VTVM across the link winding of the 2E26 plate coil. Couple the receiver very lightly to the link output terminals at the rear of the chassis. First determine if the stage is stable. If not, apply all the usual remedies of extra bypassing on the screen and plate voltage lines, moving components to give better grid to plate isolation and so on. Only as a last resort apply swamping to the grid or plate coil. If it becomes necessary, start with a large value (47,000 ohms, for example) and work downward until oscillation stops. The output of the 2E26 stage should be pretty respectable and should be at least five or ten watts. A part of the power is lost in the swamping resistor, *R61*. The grid bias to the 2E26 tube should be adjusted so



Dimensions and layout of the panel for the exciter. The parts numbers refer to the wiring schematic that appeared on page 29 of the January issue.

that the idling plate current is 35 ma. This is accomplished by inserting a milliammeter in the B plus lead of the stage and adjusting the slider on the bias power supply bleeder as already described in *Chapter VIII*.

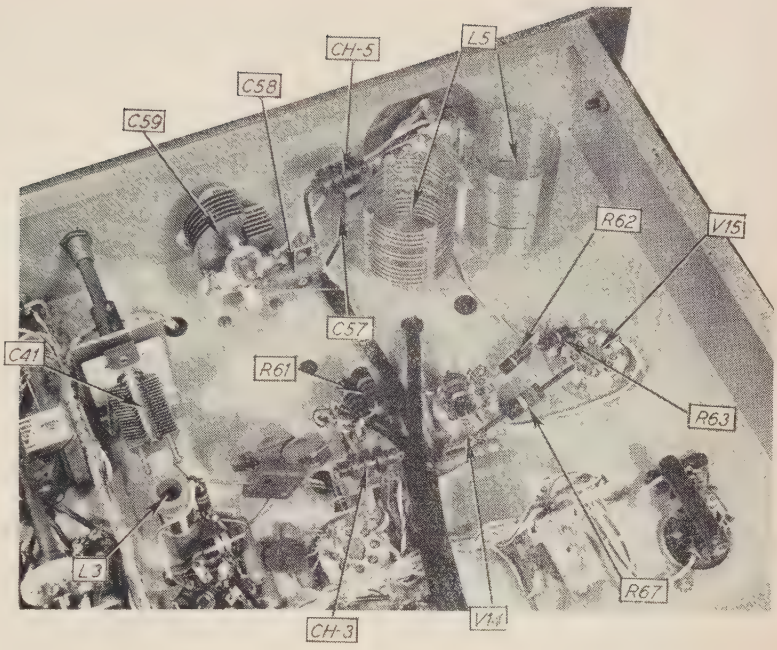
The two 6146 tubes should be plugged into their sockets, *V14* and *V15*. With the signal patched through to the 6146 stage (the co-ax terminals on the chassis rear), put the grid circuit in what *B&W* calls the "40-meter" position for the grid turret. Likewise turn the plate *BTEL* turret to the proper position for 75 meter operation—the "40-meter" coil. Apply the high voltage by throwing the high voltage switch on the power supply to the "ON" position. Connect a dummy load to the output terminal of the amplifier and slowly insert carrier as before. Tune the grid tank to resonance as indicated by an increase in 6146 plate current. Resonate the plate tank by "dipping" the plate meter, *M1*. The idling plate current should be 60 ma. and full load current on steady inserted carrier or a whistle should be 200 ma. If it is found that insufficient loading is present in the output stage, try putting a fixed mica condenser across the link terminals. For the 75-meter band a value of approximately 1000 $\mu\mu$fd. was found necessary to work into a dummy load or into the station half-wave dipole which is reasonably "flat." Smaller values of fixed condenser will be necessary for 40 and 20-meter operation.



The VFO tuned circuit is mounted in a small metal box and connected to the exciter through two coaxial cables. The dial had not been calibrated when this photo was taken.

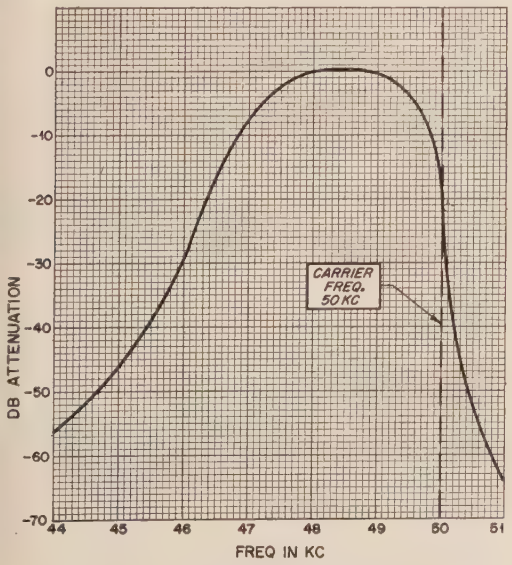
The Voice Control System

A couple of preliminary checks should be made on the voice control operation. The VTVM should be attached across the secondary of *T3* and the microphone whistled into. The meter should swing up to between 200 and 300 volts rms. Next connect the d-c voltmeter from *pin #4* of *V5b* to ground. Under the "loud whistle condition" the voltage existing at this point should be about minus 200 volts. When the microphone is spoken into in



In this under chassis view of the exciter we are looking at the right-front corner where the output amplifier grid circuit is located.

a normal tone for a lower setting of the *VOX* gain control the reading should be about minus 70 volts. All of these measurements must be taken with the *anti-trip* amplifier gain control *R1*, turned to zero. When *VOX* switch *Sw2* is in the "on" position, the relay should drop out as soon as the microphone is spoken into in a normal tone. If not, advance the *VOX* gain control until it does. The relay should remain in the "operate" position for a few tenths of a second after speech is stopped. The relay should not "pull in" between normally spoken words of a sentence, but should pull in for normal pauses in conversation. This gives the other station a chance to break in.



This is the typical response curve of a stock Burnell S-15000 filter. Note that the "steep" side of the curve is around 50 kc. and that this filter essentially passes the lower sideband. Sideband switching is employed in this exciter with the aid of 400 and 500 kc. crystals.

With the primary of *T1* connected to the audio output of the station receiver, and the *anti-trip* gain control set to zero, the sounds coming out of the loud speaker should trip the *VOX* system of the exciter. With the receiver audio set for usual comfortable audio volume, advance the *anti-trip* gain control, *R1*, until the loud-speaker audio no longer trips the *VOX* system.

Operation of this unit is very similar to that of the mechanical filter exciter and little more need be said here. The main difference that exists is the difference in output power between the two units. The plate milliammeter should kick up to between 100 and 130 ma. on normal voice input. The output should be checked with an oscilloscope so that proper settings of the gain control can be determined. Peak limiting of the output envelope is to be avoided at all times, if a clean signal is to be transmitted.

This unit has been tried on the air frequently and good reports are always received as to its "smoothness" and quality of sideband suppression. The 75 watts of output power also makes the unit heard even in the "loudest of circles."

Editor's Note: The power supply used with this exciter is identical to the one described in the author's book, "Single Sideband Techniques." The reader is encouraged to consult that text for further details.

the Hum-Free phone patch

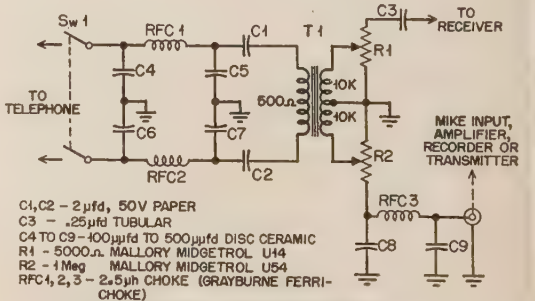
Eugene H. Hastings, W1VRK

How many times have you been asked: "Have you got a phone patch there, Old Man? I have a relative who lives near your QTH and I. . . . . ." when the reply has been: "Sorry, I have been meaning to make one up but have not been able to get one of those hum-free transformers" (at less than $20!) or perhaps: "it's not working very well—keep getting r-f feedback . . ." or even: "I have been trying to make one, but I can't find those 'surplus' parts that are supposed to be so plentiful!"

Several of the hams on Boston's North Shore area got rather tired of having to make excuses for not having a phone patch available when 10 meters opened once in a while, or when working 15 or 20, and decided to do something about it. The enclosed schematic and photographs show the finished product.

The wonderful thing about this "patch" is its versatility. Because of its very nature it can be run backwards and forwards, so to speak. Not only can you pick up signals from the phone line, but you can feed them back in—without throwing any switches—anywhere.

Dialing can be accomplished with or without the *patch* connected. Separate potentiometers control the volume of the input and output. For instance, with the *SX-71* receiver at normal listening volume, with the speaker connected, the left-hand knob of the *patch* need only be set at approximately a scale point of 2 or 3, using a range of from 1 to 10. This provides ample volume in the phone for the person listening at the other end when that important DX station



C1,C2 – 2 μfd, 50V PAPER
C3 – .25μfd TUBULAR
C4 TO C9 – 100μμfd TO 500μμfd DISC CERAMIC
R1 – 5000Ω MALLORY MIDGETROL U14
R2 – 1 Meg MALLORY MIDGETROL U54
RFC 1, 2, 3 – 2.5μh CHOKE (GRAYBURNE FERRI-CHOKE)
Sw1 – DOUBLE POLE SINGLE THROW TOGGLE SWITCH
T1 – THORDARSON (T-22-S-90) TUBE TO LINE TRANSFORMER 500Ω PRI, 20,000Ω SEC, CT OR EQUIVALENT.

Wiring diagram and parts list of the phone patch circuit designed by W1VRK.

is saying hello to a friend. Now, to enable you *or* the listener to speak to the Ham you merely flip the swith on your transmitter and you're on the air! Of course, this is assuming that when your transmitter is "on," the receiver is in some way disabled, such as in "standby" position.

The author has used his patch on 10-meter phone when a whisper would kick the modulation to a good 60%—and there has been absolutely no sign of r-f feedback. The hamshack is on the third floor and there's plenty of telephone line to pick up any available r.f. You will note that three r-f chokes are used, each by-passed. These need be only of a low-power factor, as negligible current is employed. Illustrated are the relatively inexpensive *Grayburne* ferri-chokes, although heavier-duty *National* or *Millen* chokes can be used.

The transformer is a *Thordarson* tube-to-line transformer. It is a shielded unit. This particular unit has an amateur net price of approximately $3.60—far less than the hi-fidelity shielded units often called for in phone patches. The audio quality of this unit has been praised by everyone that has heard it. None of that "tinny" quality so often associated with *patches,* has been observed.

The unit itself can be mounted on a breadboard (as some have done) but in the photograph the unit has been built in a 3″ x 4″ x 5″ channel-lock aluminum box. The output connection to the speech amplifier is made from the mike connector visible on the back cover of the patch. Shielded wire is used from the connector to the mike input of the transmitter, just as with any crystal microphone. The impedance is such that the phone patch can be used into any high-impedance microphone input without modification. The right-hand knob controls the amount of volume to the transmitter. The values stated are *not* critical.

Operating Hints

An operating hint or two is in order at this point. If your transmitter has a means for monitoring the amount of modulation (such as a meter in the class B modulator plate circuit), excellent balance can be obtained on the signal being broadcast by your station if you watch this indicator and keep your voice down (or away from the phone) while keeping the gain such that the person on the other end of the telephone line will modulate the transmitter close to 100%.

Always try to speak slowly—remember you are no longer using a crystal mike and the person on the other end of the telephone should be able to understand you too, not to mention the minimizing of phrases such as "QRX OM. ." as these tend only to confuse the uninitiated listener and often brings forth a question from said listener just as you are about to cease transmitting or check the channel for QRM.

Now, how about the phone company? How do they feel about this? In general, the telephone company has this attitude: if good engineering practice is employed, if the normal operation of the telephone is not impaired, then there is no harm done.* However, it must be pointed out that over 3 milliwatts of signal put into the phone lines will cause cross-talk in other phone circuits, and this must be avoided. A good measure is the comfortable but loud signal in your own ear via the telephone (of say, your receiver), for it will appear much louder to you than it will to the person at the other end of the telephone conversation. Your own voice is quite loud, but you just don't notice it.

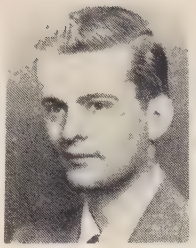
A couple of checks will surprise you. Most often the complaint will be: "It's coming in fine, but your voice is a lot louder . . ." rather than an overloading report. No permanent connection need be made to the phone line, clips will do. In the New England area, the red and green wires are the ones to tap—the yellow rings the phone—but if you made a mistake no harm done, all the phone patch leads are through condensers.

Shielded wire is not required. After all, the phone comes to you through a pretty long length of cable—unshielded. The author used a 4-prong connector for the receiver output and telephone input (and ground) connections, but the cables can come out through grommets if so desired. The tap to the receiver is through a 0.25 μfd. condenser, either to the plate of the final audio tube or to the 500-ohm speaker output. Small ceramic by-pass capacitors were used and the pots are small *Mallory Midgetrols.*

Best of luck with your new piece of shack equipment! It should bring you and others much enjoyment.

* Hindin, "The Phone Patch and the Law," *CQ*, Sept., 1954, page 13.

Editor's Note: Throughout the past year we have received a wide variety of manuscripts developing various "phone patch" ideas. The device described above has been especially selected as the one with the most universal appeal and foolproof design.



The Author

W1VRK graduated in the Ham ranks through the provisions of the Novice license. His favorite band is 10, closely followed by 75 and 15 meters—prefers rag-chewing to DX. Experiments with audio and speech equipment. Mobile on 10 and serves as EC for the town of Swampscott. Presently vice-president of the Yankee Radio Club (Salem) and secretary of the North Shore Radio Association for Civil Defense. Member of the advertising staff of the "Lynn Daily Evening Item." Home address: 28 Forest Ave., Swampscott, Mass.

the Novice Shack

Conducted by

Herbert "Herb" S. Brier, W9EGQ

385 Johnson Street, Gary 3, Indiana

After the discovery that a stage of audio-frequency amplification following the detector made it possible to hear signals that were inaudible without it (December, 1954, *Novice Shack*), it was natural to try several triodes in cascade (or in series amplification), to obtain still greater sensitivity. This was when the importance of signal-to-noise ratio became apparent.

Additional amplification did increase the strength of the signals in the head phones and made it possible to replace the phones with a loudspeaker, but it also increased the strength of the noise. Soon a point was reached where, with no signals being received, the noise was as loud as the desired signal level. This was the limit of useful audio-frequency amplification. Signals weaker than the noise could not be copied, no matter how much additional audio amplification was employed.

With today's tubes, two stages of audio-frequency amplification following the detector are more than sufficient to "go down" to the noise level in an amateur receiver.

Sources Of Noise

The major sources of noise in a receiver are the tubes themselves and the noise picked up by the receiving antenna. Tube noise may be rated in terms of how strong a signal must be when applied to the control grid of a given tube; so that the signal at its plate is stronger than the tube noise itself. Of the many variables affecting tube noise, I will mention only that the signal-to-noise ratio of any tube goes down as its operating frequency is raised. Tubes have now been so perfected that tube noise is only important in the bands below the 6-meter band.

The first tube in a receiver normally determines the ultimate noise output. This tube handles the weakest signals and its output (whether noise or signal) will override the noise generated in subsequent tubes. Regeneration in any vacuum tube degrades its signal-to-noise ratio, because each round-trip journey through the tube amplifies the noise another time.

One method of improving selectivity in early receivers was to connect several tuned circuits between the antenna and the detector. Unfortunately, it also reduced the effective sensitivity of the receiver. The losses in each additional tuned circuit reduced the strength of the signal reaching the detector.

Probably the most important precaution to observe in any radio-frequency amplifier is to keep the components—especially coils—associated with the grid and plate circuits shielded or well isolated. Otherwise, direct coupling between them will nullify the effectiveness of eliminating or neutralizing the coupling via the tube capacity.

With the aid of practical neutralizing circuits it became possible to use a string of radio-frequency amplifiers with tuned coupling circuits ahead of the detector to obtain adequate receiver selectivity and sensitivity. In the meantime tube engineers were poking around inside of their tubes. They put another grid, called the *screen grid,* into the triode between the control grid and plate, changing it to a *tetrode.*

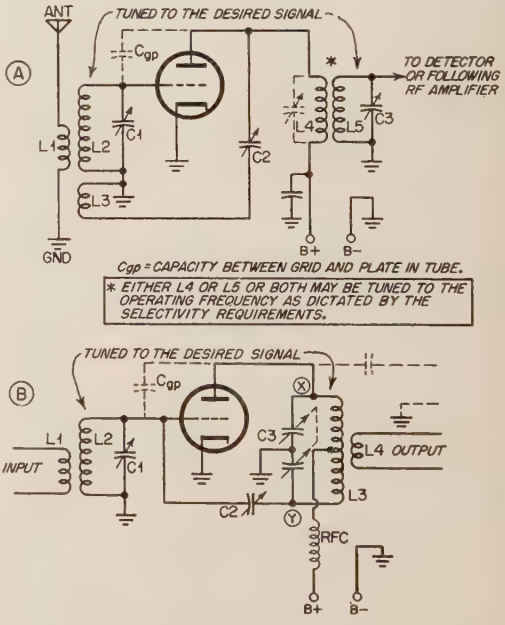


Figure 1. Two examples of circuits that may be used to neutralize the effects of grid-to-plate capacity (Cgp) in triode tubes. Variations of A, often called grid neutralization, were frequently used in early receivers. B, so-called plate neutralization, is frequently used in transmitter.

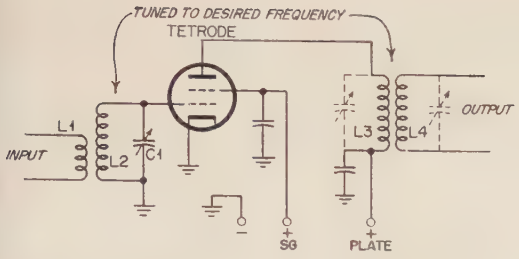


Figure 2. Adding a screen grid between the plate and control grid in a triode tube converts it to a tetrode. This decreases grid-to-plate capacity to such a low value that it need not be neutralized in radio-frequency amplifiers. This simplifies and eliminates a critical adjustment.

A solution to the problems of obtaining high sensitivity and good selectivity was to amplify the signal before it reached the detector. In this manner, a strong signal would always be delivered to the detector. Also, additional tuned circuits could be employed between the amplifier and the detector, without degrading the receiver sensitivity.

The first attempts to build tuned radio-frequency amplifiers used circuits similar to audio-frequency amplifiers, with the resonant circuits taking the place of the audio-frequency coupling units. These attempts were not very successful.

When we were discussing regenerative detectors, we learned that the feedback between the plate and grid circuits could be either inductive or capacitive. Now, as is true of any two conductors separated by an insulator, there is a certain amount of capacity between the control grid and the plate of any triode. Although only a few micro-micro-farads ($\mu\mu$fd.) in value, this capacity is about as useful in a radio-frequency amplifier as a teaspoon of sugar is in an automobile gasoline line.

It is in exactly the right place to produce regenerative feedback in any amplifier. Because the actual capacity is small the frequencies involved must be fairly high before the feedback becomes sufficient to produce harmful oscillation or instability.

This grid-to-plate capacity does not produce regeneration in a detector without additional, external feedback, because its input and output circuits are on different frequencies. The input signal is radio frequency, but the output signal is audio frequency with residual radio-frequency components being bypassed directly to ground.

Neutralization

The most practical method of eliminating the effects of interelectrode capacity in a triode radio-frequency amplifier is to introduce just enough negative (on inverse) feedback between its grid and plate to *neutralize* the positive feedback through the tube.

Figure 1 shows two of the many neutralizing circuits that have been evolved. In *A*, the neutralizing winding *L3* is spaced a short distance from the grid winding *L2*, and it may have about half the turns of *L2*. When connected as shown, the two coils are wound in opposite directions; so that the energy fed back through them will oppose that fed through the grid-to-plate capacity of the tube. Alternately, the coils may be wound in the same direction, and the connections to *L3* reversed.

Capacitor *C2* is made variable to permit adjusting the feedback to the exact value necessary to stabilize the stage.

Circuit *B* is widely used to neutralize triode radio-frequency power amplifiers in transmitters. In it, the required out-of-phase neutralizing voltage is obtained by means of the split-stator tuning capacitor across the plate-circuit coil. Grounding its rotor plates causes radio-frequency voltages of equal but opposite polarities to appear at points *X* and *Y*; therefore, connecting a capacity equal to the grid-to-plate capacity of the tube from point *Y* to the grid of the tube will neutralize the stage. Because all arms of the neutralizing bridge are capacitive one neutralizing adjustment will suffice over a wider frequency range than in a circuit utilizing inductance in one or more of the neutralizing arms. This makes the arrangement well suited for transmitters operating on several amateur bands.

The screen grid acts as an electrostatic shield between the control grid and plate. It reduces the capacity between them to a low valve that is insufficient to introduce feedback. Tetrodes designed to be used as radio-frequency amplifiers in receivers do not require neutralization.* *Figure 2* shows how this simplifies the circuit.

Adding the extra grid to the triode had other effects on its operation, some good and others not so good. We will take them up in our next discussion on vacuum tubes.

News For And About Novices

Effective in January, the **Federal Communications Commission** modified the questions appearing in the written examinations for *General, Conditional,* and *Technician* class licenses. The new questions are no more difficult than the old ones, but they could give trouble to any applicant who had prepared for the examination with the aid of an old study guide; therefore, I suggest obtaining a new *License Manual* or study guide, if your present one is not of quite recent issue.

Cliff Smith, **KN2HMG,** Box 18, Bayport, N.Y., leads off this month. "Just a little note to tell you how much I enjoy the *Novice Shack.* In eight months on the air, I have worked 21 states and Canada. I started out with a home-built, 6AG7-807, 75-watt transmitter and spent several months getting on 7 Mc. I had an **S-38C** receiver, but during the summer I saved my pay, and now I have a brand-new **SX-71.** I also have a **Heathkit AT-1** transmitter to go with my 807 transmitter. I have my Technician license and a 15-w.p.m. code-proficiency certificate, but I want to try my luck in the *Novice Roundup* before applying for my General."

Traveling to the opposite coast, we meet Jim Harpham, **KN6HAN,** 119 So. Greenwood Ave., Pasadena 10, Calif. "I have been on the air a month and a half. In that time,

(Continued on page 30)

*Transmitting type screen-grid tubes often require neutralization because their larger physical size makes their grid-to-plate capacity still large enough to be troublesome.—*Editor.*

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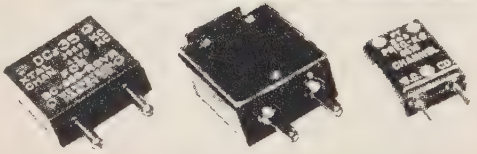

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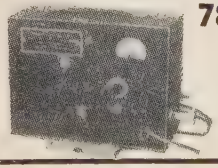

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Helen Carol Smith, WN3ZBV, Washington, D.C. does not know just how she got into Ham radio, but she is glad she did. Regularly works 80 and 40 meters. Probably has her General class license by the time this is in print

I have worked 24 states. Best DX is Connecticut. My transmitter is a **TR-75-TV**, my receiver is an **S-38A**, and my antenna is a folded dipole. All my work has been on 7 Mc. That is the best hand. . . . I am looking for schedules with amateurs on the East Coast. I can make it any time of the day or night on weekends. Also, I would like to help some prospective Novices in this area."

Dennis L. Spiker (14). **KN6GMH**, 427 Prospect Ave., Highgrove, Calif., says; "My Father (KN6GMG) and I have had our Novice tickets for about five months. Our rig is a **TBS-50D** transmitter and an **SX-71** receiver. I have worked 23 states with 14 confirmed. . . . I hope to get my "General" over Christmas vacation, if I can build up my theory. School is wrecking my Ham life, hi. . . . Doc, W6TIR, helped my Dad and me get started."

Charles Bostian, **WN3ZYP**, 5600 Purdue Avenue, Baltimore, Md., writes; "I have been on the air for several weeks. I got my license through your **Help Wanted** section. Duane Bolgiano in California recommended me to Bob, W3CQW, here in Baltimore. He is not yet 21; so he could not give me the examination. He sent me to NAT, W3RQP, who gave me the examination. He also sold me the **Heathkit** transmitter which I use. . . . I am on 3722 Kc. every day running 25 to 40 watts. I would like to arrange schedules with other Novices, especially W1's, 2's, and 4's."

Bill Glencer, **W3ZZQ**, 5450 Broad St., Pittsburgh 6, Pa., needs help. "I am 14 years old and have had my license since October 20, but I am sorry to say I have worked only two states, Michigan and Pennsylvania. My brother is W3UEP, and I am using his transmitter and receiver, which are a **TR-75-TV** and an **SX-71**. He did all right with it, working 47 states, but I am having trouble with the transmitter. He can't help me, because he joined the Marines, just before I got my license. I hope someone near me will read this and can help me. . . . I like ham radio very much and hope some day to get my *General* class license. I can copy code about nine w.p.m., but I am still a little weak on the theory. I'd like pen pals, and I will answer all letters."

A young lady from a rare state takes the stage now. She is Pat Hart, **WN7WSU**, RR #1, Box 79, Troy, Idaho. Her story is; "I have been on the air about three weeks. I have worked seven states and VE6 (Canada) on 40 and 80 CW. I am using my Dad's rig, because we haven't time to finished mine. . . . I prefer 40 meters and would like to sked anyone who needs an Idaho QSL, especially YL's (young lady amateurs). I am going to try for my *General* class license around Christmas, if I can get my code speed up to 13 w.p.m. . . . Anyone needing help obtaining his Novice, please feel free to write to me."

Right to the point, Herb Green, **W9ARI**, 1227 West 17th St., Muncie, Indiana, says; "Herb, I was reading your column. If you have anyone needing help on code around here, refer them to me, and I'll help—I hope."

Scotty Sorensen, **W6GXZ**, 11300 Elvessa St., Oakland 5, Calif., reports on his Dad and brother. "Dad is KN6GDL, Novice and Technician. His name is Norm. Bob is **KN7GDR**. They both use an 807 on 3.7 Mc., and they just 'inherited' my 2E26 rig, when I graduated to a **TBS-50**. They use the 2E26 on 7.2 Mc. . . . Dad missed the General class code test by one letter the last time he tried. He is going back again in a few weeks when he is darn sure he can copy code well enough to pass. Bob is doing fine on the code, but has been skimping the theory, until the last few days, but now he is really working on it. . . . Mom has put up a good fight, but last night we heard her mumbling something about 'QRM —Mary,' and this morning I distinctly heard 'Do you copy?' It won't be long. The cat does not have a license, but, then, they only license dogs in Oakland."

Newton W. Gephart, **WN9HFB**, Dallas City, Illinois, says; "I am 12 years old and my brother Harry, **WN9HEV**, is 11. We learned the code together and took our exams on the same day in Davenport, Iowa. We received our licenses on June third. After a few experiments with home-built rigs, we finally got on the air July 16th with our **Heathkit AT-1** transmitter and **S-38C** receiver. . . . Since being on the air, I have worked 35 states and Hawaii, and Harry has worked 22. We alternate on the rig from day to day, and we have made duplicate contacts with many of our ham friends. . . . Our Dad is learning the code; so there may soon be three hams in our family."

Jim Isenhart, **WN9KZM**, 504 West First St., Mt. Morris, Ill., writes; "I have had my Novice license for about a month and a half and have had 14 contacts in six states. Best DX is 450 miles. My transmitter is the single-tube 6F6 one described in *How To Become a Radio Amateur*. It puts out four or five watts—when it feels like it. My antenna is 135 feet long and fed in the center."

Gerald Lassiter, **WN4GRY**, 81 Third Ave., Prichard, Ala., forwards a poem:

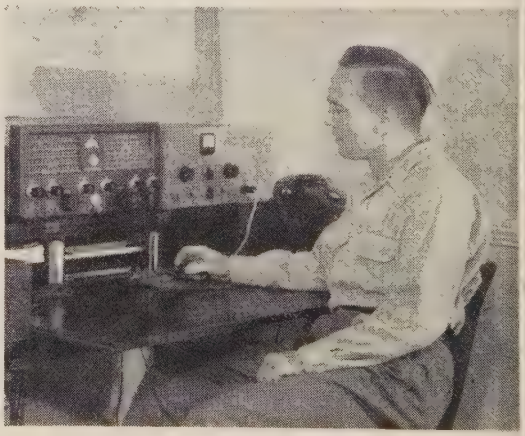
When Mother is eating breakfast
and father is eating too,
I'm sitting at my station
for DX contacts are few.

I'd like to get a WP4
for a very special reason,
Another ham that lives next door
has already got one this season.

I'd also like a KL7
for you know that's Alaska.
Mother will let me stay up late,
if I will only ask her.

James Denson, WN4GSD.

Charles Stouth, **WN3ZPP**, Box 378, Secane, Penna., would like to set up a schedule with someone in the



Richard Francies, WN8SZF, Cleveland, Ohio believes that a picture speaks for itself. The equipment is obviously an AT-1 and SX-71.

Help Wanted

Louis Marcarelli (12), 99 Willis Ave., **Medford 55, Mass.**, Phone: MY 6-0789.

Gene Brown (20), 221 SW 3rd Ave., **Fort Lauderdale, Fla.**, Phone: JA 2-2328.

Webb Linzmayer (14), 16 8th Ave., **Atlantic Highlands, N.J.**

Gilbert Rice, 3043 Voorhies Ave., **Brooklyn, N.Y.**

Marvin Buntain (16), 410 N. Lynn St., **Bryan, Ohio.**

William Stern (13), 64-14 99th St., **Rego Park 74, Queens, N.Y.**, Phone: Illinois 9-2487.

Robert S. Riggals (16), 131 Barton Ave., **Utica 4, N.Y.**, Phone: 3-4398.

Cecil Mills, Rt 3, **Winnsboro, Texas.** (Needs help with code.)

Mike Christie (16), 342 N. Screenland Drive, **Burbank, Calif.**, Phone: TH 8-4542.

Robert W. Meyer (14), Rt. 5, Box 83A, **Stockton, Calif.**, Phone: 13F3.

Dennis Johnson (13), 2845 Sepulveda, **San Bernardino, Calif.** (Wants help in getting his license and information on making a BC-224, "surplus" receiver into operation.)

Tony Dacres (12), 412 West Ninth, **Portageville, Missouri.**

Bob Mayer (12), 1308 Anson St., **Silver Springs, Md.**

Steven Pullman, 2157 Holland Ave., **New York 62, N.Y.**, Phone: UN 3-9711.

Mike Horowitz, (13), 141 Queenston Dr., **Pittsburgh 35, Pa.**

John Salness (14), 619 12th St., North, **Moorehead, Minn.**, Phone: 3-4901.

Robert S. Riggalls (16), 131 Barton Ave., **Utica 4, N.Y.**, Phone: 3-4398.

Bruce T. Wallace (20), 11 McKinley St., **Bronxville 7, N.Y.**, Phone: DE 7-8235.

Melvyn Nussbacher, KN2JZW, AM-3, SQO, VU-6, NAS, **Norfolk, Va.**, wants to hear from any Ham or Ham Club in Norfolk, Va., who will give him a chance to get on the air once in a while. He is in the Navy; so his Novice license is going to waste!

Each month, *CQ* lists the names and addresses of prospective amateurs needing help with the code or theory. To have your name listed, address your request to: Herb Brier, W9EGQ, 385 Johnson St., Gary 3, Indiana. Requests received by January 15 will appear in the March issue.

Miami Springs, Fla., area. He has an **NC-98** receiver and an **AT-1** transmitter.

Paul Neveu, **WN1CKA**, 152 Arlington St., Bristol, Conn., has been a busy boy. "In a month and a half, I worked 37 states, 30 confirmed, two WP4's (Puerto Rico), three Canadian call areas, and Hawaii. My transmitter is home made, running 75 watts, and I operate mostly on 7185 kc. I do most of my operating between 4:30 a.m. and 7:00 a.m. I would like to make skeds with anyone needing Connecticut for a new state, and I'd like a few pen pals, too."

Ronnie Camp (15½), 4269 Trent Way, Los Angeles, Calif., writes; "I have had my license five months. I have worked 37 states—35 confirmed. I have also worked Alaska and Hawaii, twice each, Canada, and Mexico. My rig is a **Viking II.** Receiver is an **NC-173.** And the antenna is a 33-foot vertical. . . . I sure wish they would invent a medicine so that I would not get nervous while taking my *General* class code test."

John Withington, 45 London St., Worthing, Sussex, England, reports hearing W9EGQ on 3.5-Mc. CW and says; "I read the *Novice Shack* in G3FXB's *CQ*. I always find it interesting. Have heard only a few Novices over here—WN1BCV on 21 Mc. and WN1BYH quite recently.

Van Fair, W4GIW, Gastonia, N.C. had this photo taken a few days after he graduated into the General class ranks. He says that many Novices are missing a good band by not paying more attention to 21 Mc.

Also heard KN2BTG, KN2AAD, and WN1WPX on 3.7 Mc. during 1953. Wrote to them all via the (QSL) Bureau, but no answers."

John's note again emphasizes the importance of having an envelope addressed to yourself on file at your call-area QSL bureau; so that you will receive any DX QSL or short-wave listener (SWL) cards sent to you via the bureaus. The envelope should be the standard "business" (or #11) size. Place your call in the upper left corner—the spot usually reserved for the return address. Place a 3-cent stamp on the opposite corner. Send to your call area QSL Manager. His address heads the listing for each call area in the *Call Book*.

Keep those photographs and letters coming. I try to use as many good photographs of Novices and their equipment each month as I can find. There's no special trick to getting your photo on these pages—just send it along with a note describing whatever you have in the background. *73, Herb.*

It took Hugh Clark, KN6HFA, Fresno, California just five weeks to work 100 stations in 18 states, Hawaii and Canada.

ALL TIMES IN E S T

EASTERN USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Northern & Central Europe	0800-1230 (2)	0600-0730 (1-2) 0730-1300 (3-4) 1300-1500 (2)	1500-1600 (2) 1600-1900 (3-4) 1900-0530 (2)	1730-2000 (2-3) 2000-0300 (3-4)
Southern Europe & North Africa	0700-1330 (2)	0600-0730 (1-2) 0730-1400 (3-4) 1400-1530 (2)	1530-1630 (2) 1630-1930 (3-4) 1930-0430 (2-3)	1730-2000 (2-3) 2000-0330 (3-4)
Near & Middle East	0700-1130 (1)	0630-1330 (2-3)	1700-2100 (2-3) 2100-2300 (1-2)	1830-2300 (1-2)
Central & South Africa	1000-1400 (1)* 0730-1100 (1-2) 1100-1430 (3)	0630-1300 (1) 1300-1730 (3)	1700-0030 (2-3)	1900-2330 (2)
South America	1000-1500 (1)* 0800-1500 (2-3) 1500-1630 (3-4)	0630-1600 (2-3) 1600-1800 (3-4) 1800-0300 (1-2)	1730-0400 (3-4) 0400-0700 (2-3)	1900-0430 (2-3)
South East Asia	Nil	0630-0900 (0-1) 1700-1900 (0-1)	0330-0800 (0-1)	Nil
Australasia	0600-0800 (0-1) 1600-1800 (1)	0630-0930 (2-3) 0930-1930 (1)	2300-0100 (2) 0100-0530 (1) 0530-0830 (2-3)	0200-0730 (2-3)
Guam & Pacific	1600-1800 (1)	0630-1030 (1) 1530-1900 (1)	2300-0800 (3)	0000-0700 (2-3)
Japan & Far East	Nil	0630-0830 (1) 1600-1830 (1-2)	0230-0830 (1)	0330-0700 (0-1)

ALL TIMES IN C S T

CENTRAL USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe	0800-1200 (1)	0600-0730 (1-2) 0730-1230 (3) 1230-1430 (1-2)	1500-1600 (1-2) 1600-1800 (3) 1800-0330 (1)	1800-0200 (2-3)
Southern Europe & North Africa	0800-1300 (1-2)	0600-0730 (1-2) 0730-1330 (3-4) 1330-1500 (1-2)	1530-1900 (3) 1900-0400 (1-2)	1730-0300 (2-3)
Central & South Africa	1000-1330 (1)* 0700-1100 (2) 1100-1400 (3)	0600-1200 (1-2) 1200-1700 (3)	1630-1900 (3) 1900-0000 (2)	1900-2300 (2)
Central America & Northern South America	1000-1400 (1)* 0800-1430 (4) 1430-1700 (1-2)	0630-0900 (3-4) 0900-1430 (2) 1430-1800 (4) 1800-0300 (1-2)	1600-0500 (4) 0500-0730 (2-3)	1800-0500 (3)
South America	1000-1500 (1)* 0700-1700 (3-4)	0600-0800 (3) 0800-1500 (2) 1500-1630 (4) 1830-0200 (1-2)	1800-0530 (3)	1900-0500 (2)
Japan & Far East	1430-1730 (0-1)	0630-0900 (1) 1430-2000 (2)	2300-0830 (1-2)	0200-0700 (1)
South East Asia	1600-1900 (0-1)	0630-0900 (0-1) 1500-1900 (0-1)	0100-0800 (1)	Nil

ALL TIMES IN C S T

CENTRAL USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Hawaii	1200-1800 (2-3)	1000-1200 (3-4) 1200-2000 (2-3)	2100-0830 (3-4)	2300-0700 (3-4)
Australasia	0630-0800 (0-1) 1530-1800 (1-2)	0630-1000 (2) 1000-1900 (1) 1900-2100 (1-2)	0000-0800 (3)	0130-0600 (2-3)

ALL TIMES IN P S T

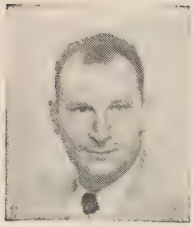
WESTERN USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	0730-0930 (0-1)	0700-1200 (1-2)	1700-0100 (1) 0100-1100 (0-1)	1800-2300 (1)
Central & South Africa	0930-1500 (2)	0600-1500 (1) 1500-1800 (1-2)	1700-2200 (2-3) 2200-0300 (1)	1800-2200 (1-2)
South America	0900-1400 (1)* 0730-1330 (2-3) 1330-1530 (3-4)	0600-0800 (3) 0800-1400 (1-2) 1400-1730 (4) 1730-0200 (1-2)	1700-0000 (3-4) 0000-0430 (2-3)	1800-0330 (2-3)
Guam & Mariana Islands	1330-1700 (1)* 1300-1900 (3-4)	1100-1230 (2-3) 1230-1800 (1-2) 1800-2100 (2-3)	2300-0830 (3-4)	0000-0800 (2-3)
Australasia	1500-1830 (1)* 1300-1900 (2-3)	0630-0900 (1) 0900-1700 (2) 1700-2000 (2-3)	0000-0800 (3)	0100-0700 (2-3)
Japan, Okinawa & Far East	1400-1830 (2-3)	1300-1800 (2-3) 1800-2000 (3-4) 2000-2100 (2)	2100-0900 (3)	2300-0630 (2-3)
Philippine Islands and East Indies	1500-1830 (2)	1400-2100 (1-2)	0100-0700 (1-2)	0330-0700 (1)
Malaya & South East Asia	1600-1900 (0-1)	0900-1100 (0-1) 1500-2000 (1-2)	0300-0700 (1)	0400-0600 (0-1)
Hong Kong, Macao & Formosa	1430-1800 (2)	1400-2000 (2-3)	0000-0700 (3)	0130-0600 (2)

Symbols for Expected Percentage of Days of Month Path Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

The CQ Propagation Charts are based upon a CW radiated power of 150 watts and are centered on Washington, D.C., St. Louis, Missouri and Sacramento, California. These forecasts are, for the most part, calculated from basic ionospheric data published by the CRPL of the National Bureau of Standards and are valid until March 15th, 1955.

Ionospheric Propagation Conditions



Forecasts by
George Jacobs, W2PAJ/W3ASK
607 Beacon Road, Silver Spring, Maryland

General Propagation Conditions—February

6 Meters: Not much in the way of ionospheric propagation expected on this band until the late spring months when sporadic E "short skip" begins to increase.

10 Meters: DX conditions generally poor, with some erratic daylight openings to South America and South Africa during periods of exceptionally good propagation conditions.

15 Meters: Optimum propagation conditions for DX on this band has passed its seasonal peak, but fair to good world-wide DX conditions continue during the daylight hours.

20 Meters: Fair to good DX propagation conditions from shortly after sunrise to shortly after sunset expected during February.

40 Meters: Fair to good late afternoon and evening world-wide DX conditions continue with atmospheric noise quite low and signals strong on many paths. Considerable improvement in conditions to Australasia expected during February and March.

80 Meters: Generally fair DX conditions to many areas of the world from shortly after sunset to shortly after sunrise. Atmospheric noise levels increasing as spring and summer approaches.

160 Meters: Fairly strong night-time signals possible on some DX paths during periods of low atmospheric noise levels.

This overall picture of band conditions is intended to indicate qualitative changes in each amateur band from month to month. For specific times of band openings for a particular circuit refer to the *CQ Propagation Charts* on the opposite page.

Sunspot Cycle

This month's charts are based upon a predicted smoothed sunspot number of 11, centered on February, 1955. The monthly Zurich sunspot number observed for November, 1954, was 8.7 resulting in a provisional Zurich 12-month running smoothed sunspot number of 3.6 centered on May, 1954. The 12-month smoothed sunspot number for April was also 3.6. Therefore the sunspot numbers, which have been decreasing month by month for the past several years, have remained at the same low value for two successive months. This indicates that it will probably be the actual minimum of the cycle. (See graph in the January column.)

DX Contest Review

Adequate data are now available to determine the propagation conditions that existed during the recent *International DX Contest.*

In the October column conditions for the contest period were forecast as follows:

October 23—Poor to Fair

October 24—Fair

October 30—Fair but unstable

October 31—Fair but unstable.

A moderate ionospheric disturbance was also forecast for October 23rd.

An analysis of propagation data indicates that the following conditions existed during the Contest period:

Propagation conditions began fair on October 23rd becoming poor during the evening hours as a moderate ionospheric disturbance began. The disturbance continued through the 25th with conditions poor on most circuits on the 24th. Conditions were fair on the 30th becoming fair to good by the afternoon of the 31st. Conditions remained fair to good during the late hours of the 31st, but became increasingly unstable as a moderate ionospheric disturbance began during the early hours of November 1.

Book Review

Our recent discussion of the sunspot cycle created considerable interest. Almost all of the mail received during the past few weeks contains questions on sunspots and the sunspot cycle.

This month I would like to mention a publication on the subject of sunspots—**Sunspots In Action** by Harlan True Stetson. Dr. Stetson is the former Director of the Cosmic Terrestrial Research Laboratory at Needham, Massachusetts. The aim of Dr. Stetson's book is to bring together relevant information in the several fields of science that bear upon the relation of the sun to the earth. Considerable emphasis has been placed upon the effect of the sun upon long-distance radio communication.

The book has been written primarily for the layman and technical language has been reduced to a minimum. The initial three chapters of the book are a discussion of the characteristics of the sun—its rotational periods, heat, energy, etc. The next two chapters are devoted to sunspots and radio communication. The formation of the ionosphere is discussed as well as the propagation of short waves. Particular note is paid to propagation predictions and sunspots. Other phenomena associated with the sun and sunspots are discussed in the following three chapters. This includes a description of the earth's magnetism, the northern lights, eclipses, etc. Three chapters tell of the sunspots themselves, their origin and history and a discussion of their cyclic nature. The concluding five chapters are an exceedingly interesting presentation of the effects of sunspots upon weather, living things, and the economic cycle.

The book also contains a table giving the mean monthly Zurich sunspot numbers from the first year of reliable count, 1749, to the year 1947. An excellent bibliography is also appended for those who may wish to pursue the subject further.

If you have an interest in sunspots—Stetson's **"Sunspots In Action"** should be a welcomed addition to your library. It is published by the Ronald Press Company of New York and can be obtained through your local book dealer for $4.00.

DX

and Overseas News

Gathered and reported by
R. C. "DICK" SPENCELEY, KV4AA
Box 403 St. Thomas, Virgin Islands.

For some time we have been plugging the recommendation that Ruanda-Urundi, OQØ, and Sicily, IT1, be accorded separate country status. It is thought, as outlind below, that ample justification for this move exists.

We believe that a liberal recognition policy, within intelligent limits, tends to stimulate DX operating and reflects majority opinion in the DX ranks.

In the case of Ruanda-Urundi and Sicily many efforts have been made for recognition without success. Ruanda-Urundi is a *Belgian Trust Territory* dating from World War I. It lies between the Belgian Congo and the *Trust Territory of Tanganyika* (which *IS* a separate country). Other *African Trust Territories* considered separate are French Togoland, FD8; French Cameroon, FE8 and Southwest Africa, ZS3, which is under Mandate to the Union of South Africa. Two Trust Territories which do not enjoy separate status are British Togoland and British Cameroon administered by Gold Coast and Nigeria, respectively.

Through the efforts of OQ5RA, OQ5LL and the Belgian Congo U.C.A.R. the official prefix of Ruanda-Urundi was changed from OQ5 to OQØ in 1953. Shortly thereafter the Belgian Society U.B.A., which had hitherto opposed separate status for this area, was approached, and through the efforts of such Belgian DX'ers as ON4AU and ON4QF was persuaded to reverse its stand. After clearing this matter with the Belgian Government, the U.B.A. sent us a letter stating that Ruanda-Urundi would now be considered as a separate country for ham purposes. (This letter appeared in November 1953 *CQ*).

The case of Sicily is very similar. The Italian Government has seen fit to designate a separate prefix, IT1, for this area. It is geographically separated from Italy by the Straits of Messina and has a government similar to Sardinia, IS1, which *IS* a separate country. The Italian society A.R.I. has requested recognition three times for Sicily and has been turned down.

In view of these facts and, most important, in view of the desire of an overwhelming majority of DX men for this action, such refusal is somewhat beyond me!

A gander at the present country list will show a lot of "so called" countries whose recognition borders on the ridiculous by any rules. Examples are Clipperton Island, administered from Tahiti. Turks and Caicos, administered from Jamaica. The VP8 group, administered from the Falkland Islands. Navassa Island and the San Andres group. The latter two were recently accorded recognition without waste of time. Maybe the word "area" in the place of "country", as suggested by G2MI, would make these easier to take. Yet we are happy to go along with such recognition that has added much zest to DX operating as the FO8AJ and KC4AB expeditions have shown. Why not, then, accept Ruanda-Urundi and Sicily who present as good a case, if not a better one, than many other selections for such recognition? (I have just received a letter bearing the signatures of fifty Japanese hams who are lobbying for the acceptance of Sicily!!).

The *CQ DX Committee* bases its recognition policy on the following points:

1. **The stated desire of the radio societies in any such area along with requests by the radio societies in the parent, or controlling, country when backed by accord from the local and parent government.**
2. **Its geographical separation from the parent country by border, water, historical background or treaty agreement.**
3. **The difference of radio prefix used in such an area.**
4. **Issuance of its own postage stamps bearing the country's name.**
5. **Known wishes of the majority of DX men.**
6. **Possible political reaction to separate status.**

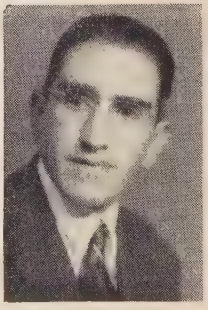
CQ's DX Committee has voted unaminously for the acceptance of Ruanda-Urundi and Sicily on separate country status. However some committee members feel that there should not be two separate country lists in the U.S.A. Until this matter is settled, one way or another, we are *NOT* adding these countries to *CQ's* official list.

(Continued on page 36)

KV4BK, St. Croix, Virgin Isands, was recently set up by old-timer Charlie Morenus, better known as W5RX. Charley is very active and plans a long stay in KV4-land.

TI2BX, San Jose, Costa Rica, is much in evidence these days and is active on all bands. The OM, Ted Westlake, has held the calls of Canadian 5FU 1922/30, W6RIG 1949/41 and CP1BX 1952/53. His XYL, Ginny, is very popular on 21 Mc. Phone and has recently acquired the MMARC Certificate. Since the appearance of TI2BX, 78 countries and 28 zones have been worked. Gear: A Viking II, NC-183-D receiver with a DB23 preselector with a beam on 14 and a 210-ft. long wire for 28, 7, 3.5, and 1.8 operation.

Photo courtesy of the North Calif. DX'er



Carlos Miranda Rodriguez, CP3CA, of Oruro, Bolivia, is quite active on 14 Mc. handing out those CP contacts.

W6BYB, John S. Mayes, of Sebastopol, Calif. Well known on the Ham bands since 1928, John is a confirmed traveller and has operated from Ham stations in 39 countries and five continents. A den is now being completed which will house KW finals on all bands pushed by a B & W 5100. His score: 170 worked in 39 zones.

Here are Ray, EL2X and Frank, OE1FF, in Vienna during the former's recent vacation. Ray returned to EL2X in mid-December.

Britain's RSGB is in full accord with *CQ* in this matter. We regret exceedingly that the ARRL has seen fit to reject our committees offer towards co-operative action on DX matters.

Present VP8 Locations

SOUTH SHETLANDS—VP8AO. FALKLAND ISLANDS—VP8BC. ANTARCTICA—VP8AA, VP8AD, VP8AX, VP8BA, VP8AZ and VP8BE

(Thanks to W9HUZ, VP8AA and *West Gulf Bulletin*)

There is no present activity on South Georgia or South Sandwich.

DX Notes

Via VK1EG and W3JTC we hear that a relief ship was due at the Kerguelen Islands in December. Joe, **FB8XX** (ex-FB8ZZ), will sail for home and a new gang will take over. A new ham station will be active from this spot in January probably with the same call sign. . . . . From SM5AHK we learn that there is a ham on Jan Mayen signing **LB1LF**. He is on 7010 XTL. Another operator at "LMJ" has applied for his ham ticket and should be on as this is read. Present activity from Spitzbergen or Bjornoya (Bear) Island is "not known". . . **ZM6AS** was due to operate from Tokelau in early December. We understand the call "ZM6AS/A" was used as the prefix ZM7 is not official. Bari, **VR2BZ/ZM7**, paid his second ham trip to Tokelau on December 14th. . . . **ZA1BB** has been active on 14 Mc. giving his name as "Alex" and QTH as: Box 2, Korce, Albania. Hope he's a good one. . . . **VP5AE** has been heard on 14-Mc. phone. Don't pass this one up as Dow is operating from Grand Turks Island in the Caicos group. He will be active there for several months. QSL's should go to **W8LMO**, his home QTH. . . . Via the *West Gulf Bulletin* we hear that **VS4HK** is xtl controlled on 14030, 14100 and 14200 kc. with 28 watts. He is active most days from 1000 to 1145 GMT. Des will go to Brunei, signing **VS5HK**, in January. **VK6MK** hears **ZC3AC** on 14163 every day at 1130 GMT, A3. He is a commercial operator, has a foreign accent and will be there several years. **VK1HM** is back in Perth, but left his rig on Cocos where it will be operated by a meteorological officer as soon as a license is granted. **VK6MK** can help on missing **VK1HM** QSL's if exact details are given. **ZL1MP** now ops as **VP7NI. ZS1SW** says that **ZS2MI**, Marion Island, has resumed operation and can usually be heard on phone, 14150 kc. **G2DPY** states that all applications for ham operation from the Vatican City, HV, have been refused and this policy is likely to continue.

FB8BK, Tromelin Island, who went QRT and returned to Madagascar on Nov. 25, will be replaced by another ham when a license is obtained. . . . **FE8AE**, ex-FF8AN, should have been on from Cameroon in January. Marcel runs two 807's in parallel to a Window antenna. . . . A French Antarctic expedition will leave for Adelie Land, on the Antarctic continent, this year and will be maintained until 1959. Thus, **FB8AX** will be on the air again. Due to unsettled claims, etc. the entire Antarctic continent presently counts as only one country. We hope, at some time, that the French, British, Australian, New Zealand, Chilean, Argentine, U.S. and Norwegian sections will have their own identity as separate ones. Now, VP8AA and VK1EG, some 3500 miles apart, count the same. . . . Thanks to Bob, **VR4RO**, a new permanent VR4 station will soon be on the ham bands manned by Mike who is an excellent CW man. 250 watts may be run. . . . **W4CEN** reports that a new JZØ has appeared. He is **JZØDN**, ex-PAØON, and operates from Biak Island. Presently he is on 7 Mc. only and operates from battery power. He will be there eighteen months and QSL's should go via PAØDN. . . . **KC6CG** left for home on Dec. 12th. QSL via W6IOH, 521 Tudor Road, San Leandro, Calif. . . . **JA1SR** received QSL from **BV1US** (Formosa) one week after QSO. . . . **JA1CR** informs us that the JARL plans an expedition to Nepal but many difficulties are involved. The JARL will soon have the **ADXA** (Asian DX Award) on the market. Details will be announced. . . . Paul, **K2GFQ**, received a QSL from **FB8BR** whom he describes as Madagascar's newest and most active ham. FB8BR runs 8 watts to a ground plane antenna on 14-Mc. CW and his ex-FF8AX '53/F9AE '46-'52 and has held F calls dating back to '22. His name is Hubert Hoffman and his QTH appeared in January **CQ**.

Endorsements to Honor Roll

(To December 15, 1954)

W6SN	40-250	W6UHA	40-223	W6LGD	39-172
W6SYG	40 250	W6LW	40-201	WE3LJ	37-167
W8PQQ	40-248	W6LN	40-200	W4EPA	37-166
W2AGW	40-246	W3EPV	39-234	W5FXN	35-172
W8NBK	40-246	W2QHH	39-226	W2HAZ	35-115
W6TS	40-237	W4GG	39-216	PHONE	ONLY
W6GDJ	40-235	W3KDP	39-205	W6AM	38-176
VK2ACX	40-230	W4RBQ	39-202	W3EVW	35-167
W6TI	40-226	W6WO	39-179		

New DX Address

AP2Q——Aslam, 121 Garwood Road, Quetta, Pakistan.
AP5TM——Captain McLuskie, Departmental Club, Edwards Road, Rawalpindi, Pakistan.
CR6CW——Box 1400, Luanda, Angola.
ET3LF——Box 114, Addis Abbaba, Ethiopia.
F7-Bureau——F7DZ, Hq and Paris Det. SASC 7961 AU, APO 163, PM, N.Y.
JZØDN——Via PAØDN.
K6INI, ex-TI2TG-Tom Gabbert, 1243 East Meta St. Ventura, Calif.
KC6CG——Via W6IOH, 521 Tudor Rd., San Leandro, Calif.
KC6ZB——R. Q. Stoughton, Yap Island, Western Carolines.
LU4XQ——Dardo Ferrate, Aeronaval, Rio Grande, Tierra del Fuego, Argentina.
VE7AHG (New)-Bob Sanderson, 1182 Langley St., New Westminister, B.C. Canada.
VP5AE (Turks and Caicos)-Via W8LMO.
VP5LE——Len, Caribbean Sig. Sqdn., Up Park Camp, Kingston, Jamaica, B.W.I.
VQ3FM——Box 1313, Nairobi, Kenya.
VS1EW——Herman, P.O. Box 1158, Singapore, SS.
VS1GF——Len Hall, Wenchelecca Braddel Rise Hostel, Braddel Rise, Singapore.
ZA1BB——Alex. Box 2, Korce, Albania.
Thanks to the West Gulf Bulletin, W4TYE, W3EPV, VK3CX and W4CEN.

160 Meters

Conditions seemed to be rather poor for the December 5th transatlantic test with a very high QRN level. The following were QSO'd from **KV4AA**: W8ANO, W3EIS, KV4BB, TI2BX, KP4DV, W4JSS, W2GGL, KP4CC, KP4KD and W9PNE. Some across the pond contacts may have been made but none were heard here. W signals were certainly getting across as British SWL, Norman Smith, reports hearing the following stations during this test: W8KIA, W8GDQ, W8ANO, KP4CC, KV4AA, W3EIS, W9MKO, W4ZQ, KP4KD, W1VDB, KP4DV, W9PNE, W9NH. On the European side he heard HB9CM, G5JU, G3PU, GW3INO, G6PD, G3IVJ, G3JVL and EI9J. . . . Three FIRSTS were made on November 28th in contacts between **W1BB/LU3EL, KP4KD/YV5DE** and **LU3EL/-KP4KD** another first occurred when **W3RGQ** nabbed **W4KVM/VO6** in Labrador. . . . Other top-band news comes from Shelly, W3RGQ, whose very complete bulletin advises us as follows: **ZC4GF** runs 55 watts on 160 and

(*Continued on page* 55)

Updating the 32V-1

Norm Snyder, K2ERC, ex W3HRD, J3AEE

Here is a swell article for 32V-1 owners. K2ERC explains some simple changes and additions that give this fine transmitter even more versatility. It's not hard to see that Norm is a DX and contest expert, as the descriptions are aimed at ease of operation.

Owners of the *Collins 32V-1* who are interested in holding on to it, should find these changes and additions worth while. They are designed to give the operator some of the features that most modern stations have. These include fast band changing when using an all band antenna, a simplified tune up procedure, and a rapid means of switching the rig either as an exciter or an "on the air" transmitter.

I have had my *32V-1* about five years, and am resigned to the fact that it will be part of this station for a long time to come. Over this period of time these refinements came about as a result of a lot of operating time. When this is the case most operators are forever on the lookout for an easier and more efficient way to run the station.

The modifications involve nothing above the average amateur and are not expensive.

Most stations today utilize co-ax cable in the antenna system in one way or another, as one step toward eliminating TVI. This is what brought about the first change in the *32V-1*.

An SO239 co-ax connector can be mounted on the back cover 1½ inches below the "hot" antenna connector. It is wired in parallel with the *32V-1* output connector using a short piece of #10 bus wire. The *32V-1* output connector should be left in the circuit, as it can be used as a convenient spot to connect a dummy load.

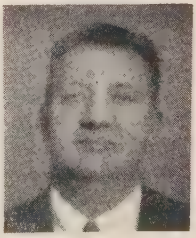
A means of lowering the plate voltage is always a convenience when tuning up a transmitter. It can be done on the *32V-1* with a very simple change. Take the green pilot light off the front panel, disconnect the wires and tape them up. Next, remove the *600-700* volt switch from the rear skirt of the chassis and move it into the hole formerly occupied by the pilot light. You now have a front panel control to lower the plate voltage for tune-up.

The next modification, although simple, eliminates one operation when changing frequency on CW. Connect a jumper between terminals #2 and #3 of the CW-CAL-PH switch, *S302E*. This results in a closed key circuit when going from CW to CALIBRATE position.*

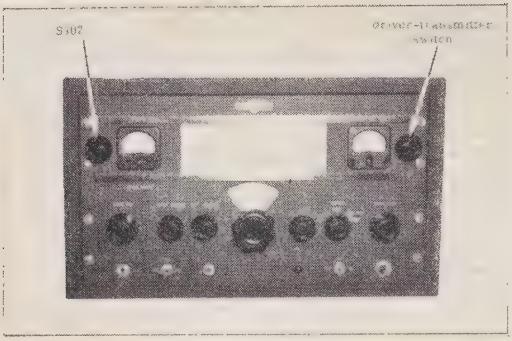
When I built a new console operating position I found that I had to do something about the coarse antenna loading switch, *S402*. Originally it was mounted inside the top cover, and

*If the rig is keyed at all times in CALIBRATE, you must throw the HV ON switch off to go to a standby condition. You could then calibrate by going to CAL. To get on the air, you would have to throw the CW-CAL-PH switch to CW and the HV ON switch to ON. This could become rather involved, especially in contest work. Another way would be to let things as they are and use the CW-CAL-PH as a means of going on or off the air, going from CW to CAL respectively, and leaving the HV ON switch on at all times. . . . **Collins Radio Co.**

The Author...



K2ERC has been licensed since 1938 when he was issued the call W3HRD. In 1946-7 Norm operated from Kyoto as J3AAE. He holds WAS, WAC, DXCC and is in the almost WAZ class with 38 zones confirmed and all 40 worked. Though most of his activity is on 20-40-80 meters he is all set up on all bands from two up. Norm is past president of the Philadelphia Wireless Association and is a member of the Frankford Radio Club of Philadelphia. His hamming time is divided mostly between DX'ing and equipment construction, but everything else stops when a contest comes along. Employed as a Laboraory Technician at RCA and is attending evening college majoring in Physics.



Front view showing S402 and the driver-transmitter switch in their new positions. The driver-transmitter switch is placed to the right of the plate current meter.

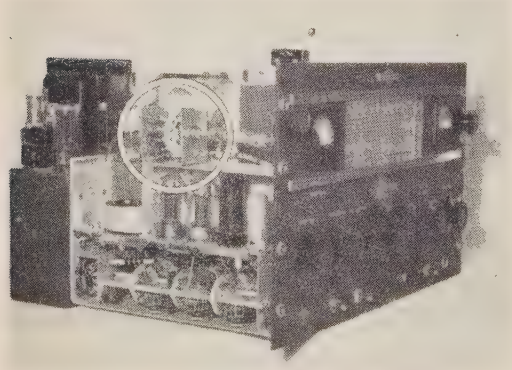
in order to get at it I had to pull the cabinet out of the console every time I changed bands. The *32V-1* is very compact, and there isn't any wasted space, but after a little head scratching I found a new position for the switch. The switch and it's associated mica condensers is now mounted on a "U" shaped aluminum bracket to the left of the final tank coil. The bracket is fastened to the shield covering the multiplier stages.

A panel bearing is installed to the left of the grid current meter. A flexible coupling is used to line up the panel bearing with the shaft of *S402*. Front panel control is now available for the coarse antenna loading operation.

At times the *32V-1* is used here to drive a high power final, which had presented the problem of getting to the back of the chassis to change the jumpers on the rear terminal strip. I decided that these jumpers could be switched, and started the search for space all over again. A switch can be placed in the upper right corner, just to the right of the plate current meter. Incidentally, it is symmetric to the new location of *S402*.

A *Centralab PA2007* switch is used. It is essentially a three pole-double throw type. The jumpers are now connected through the switch and wire changing is eliminated. I run the wire from *#4* terminal to ground, and connected *#3* and *6* to the other side of the key circuit. This permits either inserting the key in the front panel jack or the terminal strip. I found it necessary to bend the shorting strip of metal in order to make an open-circuit type of jack. In doing this, the key circuit will not automatically be closed when connecting the key leads to the rear terminals.

Last, but by no means least, the hole left by the removal of the *600-700* volt switch can be nicely filled with an extra microphone jack. This is an ideal arrangement when hidden wires are part of a station layout.



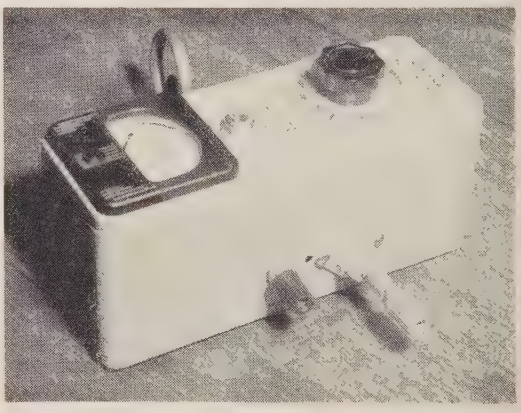
Oblique view showing the new position of S402. The front panel control is to the left of the grid current meter.

Co-ax Fitting for Antenna Meter

R. R. Hay W4LW

414 New Hampshire Avenue, Norfolk, Va.

The *HEATHKIT Antenna Impedance Meter (Model AM-1)* has binding post connections for the load to be measured. Since co-ax fittings are used extensively at **W4LW,** the "above ground" binding post has been replaced by a type *83-1R* co-ax receptacle.



Photograph showing the installation of co-ax fitting on the Heathkit AM-1. The use of the banana plug is optional.

The photograph shows the co-ax fitting and the ground binding post, which was left in place. The removed binding post was secured in a banana plug (*E. F. Johnson Type 108-75C*). The photograph also shows the banana plug in place for optional use of the binding post.

It will be noted that the *Impedance Meter* has been fitted with the Faraday shield described by W2FRQ in the February 1954 issue of *CQ*.

the YL's Frequency

Monitored by

Louisa B. Sando, W5RZJ

Jicarilla Apache School, Dulce, New Mexico

6th Annual YL-OM Contest

The **YL-OM Contest** this year will feature separate weekends for phone and CW operation, instead of combining them as heretofore. The phone section is scheduled for March 5-6. Because of the DX contest falling on the next weekend, the CW section of the **YL-OM Contest** will be run off two weeks after the phone section; March 19-20. Come on, guys and gals, the more the merrier—and here's a good chance to build up contacts for **YLCC** and **WAS/YL.** Here are the details:

DATES: **Phone:** Start Sat., March 5, at 1:00 p.m. EST. End Sun., March 6, at 12 midnight EST.
CW: Start Sat., March 19, at 1:00 p.m. EST. End Sun., March 20, at 12 midnight EST.

ELIGIBILITY: All licensed OMs. All licensed YLs and XYLs.

FREQUENCIES: All bands.

PROCEDURE: Call "CQ YL-OM."

EXCHANGE: QSO number; RS or RST report and State, U. S. Possession, VE District or Country.

SCORING:
a—One point for each station worked (YL to OM or OM to YL only).
b—Stations and multipliers count only once, regardless of band or mode of operation.
c—Add number of points and multiply by number of different States, U. S. Possessions, VE Districts and Countries worked.
d—All phone contestants running 150 watts input or less at all times may then multiply final score by 1.25.
e—All CW contestants running 150 watts input or less at all times may then multiply final score by 1.25.
f—Maryland and District of Columbia count as one State.

AWARDS:
Highest OM score phone to phone—cup and certificate.
Highest YL score phone to phone—cup and certificate.
Highest OM score CW to CW—cup and certificate.
Highest YL score CW to CW—cup and certificate.
Second and third highest in each category will receive certificates.
The winner of one award is not eligible for any other award.
These cups are awarded on a yearly basis with a three-time winner obtaining permanent possession.

LOGS: Copies of contestants logs for Phone section must be postmarked not later than April 1, 1955; for CW section they must be postmarked not later than April 15, 1955; and must be sent directly to Gilda Shoblo, W6KER, Vice President YLRL, 3715 Liberty Blvd., South Gate, California. All contestants must fill in their own logs while operating. No help is permitted. Contestants are requested to send in separate phone to phone, CW to CW, phone to CW, and CW to phone logs. Please state power input. Please send in copies of logs, regardless of size of score, to help in cross-checking other logs.

TQ's of Casper, Wyo.

Looking through the Call Book one day we came across calls **W7TQO, TQP, TQQ** and **TQR** all with **QTHs** of Casper, Wyoming. Must be a story there—and a note to W7TQP brought the answer. Seems W7HYW, Herb Haass, teaches the 7th grade at Park School in Casper. Along

Pictured at the West Gulf Division Convention at Kerrville, Texas, Oct. 2-3, left to right: W5's RYX, WXT, JAD, TSE, QXR, YAJ, YCV, (next three unidentified), SPV, AMI, SYL. Other YLs enjoying the convention were W5's DUR, DEW, KQG, EWH, EGD, WMR.

with the customary readin', 'ritin' and 'rithmetic he gave his whole room some radio practice and they started the **Park School CQ Club.** Although many soon lost interest, Jan Moulden (not a YL), Georgia Doll, and Carol Dugan went ahead and built converters and got Novice licenses —along with their school principal, Clifford Doscher (TQQ). Then they built transmitters and in Feb. '54 took exams for Conditional class licenses. While waiting for their new privileges they built VFOs, and on March 1st they dropped the "N" from their calls. Now Jan, TQO; Carol, TQP, and Georgia, TQR, are freshmen in high school. Still much interested in Hamming, Carol has worked all States and the others are close behind.

YLRL Convention

As you can see from the accompanying box, plans for the **First International Convention** of the **Young Ladies' Radio League** are progressing rapidly. The program as outlined above promises to be a full and interesting one. Charge for convention tickets, to include *all* of the events listed, will be $10. (OMs will pay $5 for banquet ticket.) The *Los Angeles YL Club* will make no profit on the convention; all money will be used for the convention.

Members of the *L.A. YL Club* are opening their homes to visiting YLs for those who wish to stay in private homes. Maxine will soon appoint a *Hospitality Chairman* who will handle requests for accommodations in the YLs' homes.

For those who wish to stay at the *Miramar Hotel* (one of the country's finest), **W6LBO, Mary,** says early reservations are imperative as the convention comes at the busiest season. **W6UHA, Maxine,** *Convention Chairman,* suggests those who plan to stay at a hotel and have no preference stay at the *Miramar* for their own convenience and through courtesy to the management, which is extending the YLRL their hospitality without insisting on any given number of room reservations.

W6PJU, Mildred, *L.A. YL Club* president, will be official hostess for the convention. Note that all licensed YLs, whether or not members of YLRL, are invited to attend the convention. To date (mid-December) Maxine has had reports from all U. S. call districts and Hawaii that the YLs will be well represented. See *you* there?

Nets Listed With YLRL

PHONE

Band	Freq.(kc)	Day	Time	NCS
75	3970	Mon.	10:00 a.m. CST	WØUDU (alternate—WØBFW)
	3900	Wed.	7:00 a.m. EST	W1VOS
	3900	Wed.	9:30 a.m. EST	W8ATB (alternate—W8HUX)
	3900	Tues.	8:00 a.m. EST	W4HLF
	3900	Mon.	3:00 p.m. PST	W7HHH (alternate—W7SBS)
	3820	Wed.	10:00 a.m. PST	W7QYN (alternate—W7SYE, W7NJS)
40	7215	Thurs.	10:00 a.m EST	W4SGD
20	14,293 (SSB)	Tues.	2:30 p.m. EST	W4DEE (alternate—W4JYD)
	14,240	Thurs.	11:00 a.m. PST	W6UHA
10	28,900	First Tues. of each month 9:00 p.m. EST QRMary Net		

CW

80	3680	Mon.	9:00 p.m. PST	W7GLK
	3610	Wed.	9:00 p.m. EST	W9JTX
40	7034	Tues.	1:30 p.m. PST	W7ROA (alternate—W7RLH)

YLRL Callbook

The **Young Ladies' Radio League** will publish a new edition of the *YL Callbook* this spring. **W6NAZ, Lenore,** has accepted the editorship. All *YLRL* members in good standing (*dues paid*) as of Feb. 15 will be listed therein. Any YLs wishing to join *YLRL* are urged to do so before Feb. 15 to insure being listed in the *YL Callbook.* (Drop your column editor a note for application forms.) The *Callbook* will be ready by April, and will sell for $1. Send your orders for the *YL Callbook* to W6NAZ, 14867 Round Valley Drive, Sherman Oaks, Calif.

YLRL Appointments

YLRL President W6CEE, Vada, announces that **W7OOY,** Jeannine, has accepted the 7th District Chairmanship for YLRL. . . . Both **W9YBC, Gloria,** YLRL's publicity chairman, and **W6LBO, Mary,** Los Angeles YL Club P/C, will assist in handling publicity for *YLRL's First International Convention.*

1st International YLRL Convention

Date: June 24-27, 1955
Place: Miramar Hotel, Santa Monica, Calif.
Sponsors: Los Angeles YL Radio Club
Chairman: W6UHA, Maxine Willis

Program

Friday p.m.: Registration and reception
Sat. noon: Luncheon, business meeting, exhibits, program
Sat. night: YL-OM banquet, installation of officers, program
Sun. p.m.: Family picnic on the beach at Santa Monica Bay
Mon. a.m.: "Kaffee klatsch," followed by a mobile motor tour of Hollywood

Thanks to W7HYW, their 7th grade teacher, these girls mastered radio along with their readin', 'ritin' and 'rithmetic. L. to r.: W7TQR, Georgia, and W7TQP, Carol.

YL Nets

The nets listed in the accompanying box are those recorded with YLRL as of the middle of December. The 75-meter phone (3820 kc.) Wednesday net at 10 a.m. PST is known as the **NYLON** (*Northwest Young Lady Operators Net*). *NYLON Beacon* (freq. marking station) is **W7FWR.** Organized for YLs of Washington State primarily, it includes check-ins from Oregon, Idaho and Canada.

The 20-meter phone net on 14,293 kc., Tuesdays at 2:30 p.m. EST is one newly organized by **W4JYD, Chris,** and **W4DEE, Beulah,** for single-sideband stations. **W5TDB, Emma,** will check in and any other YLs interested are invited to join. Anyone else not on SSB wishing to tune in the girls, set your receiver as if you were copying CW —AVC off, BFO on, audio gain up, r.f. gain down and use r-f gain to control signal level.

(Continued on page 42)

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National NC

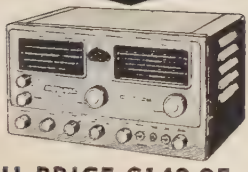
The NC-98

ONLY $8.19

per month

Pay Just $15.00 Down

Top-notch value! Now, for the first time, a crystal filter, an S-meter, electrical bandspread, a large, easy-to-read slide rule dial, an RF stage and 2 IF stages — only a few of its many fine features.



CASH PRICE $149.95

National NC

The NC-183D

ONLY $21.78

per month

Pay Just $39.95 Down

Designed for maximum sensitivity and selectivity. Dual conversion added to IF system with 1720 kc. first conversion frequency. Special push-pull, high fidelity audio system incorporated. Includes all time-tested features of the NC line.

CASH PRICE $399.50

National NC

The NC-88

ONLY $9.54

per month

Pay Just $12.00 Down

Built-in speaker, advanced AC superhet circuit, tuned RF stage, 2 IF stages, 2 hi-fi audio stages with phono input. Separate hi-frequency oscillator. Many, many other features. Ask us for complete specs.

CASH PRICE $119.95

Bandswitching GLOBE KING

WRL's new 500 watt Xmttr. for 10-160M. Provisions for VFO and SSB input and operation. Pi Network matches any antenna, 52-600 ohms. Completely TVI screened and by-passed.

Bandswitching GLOBE SCOUT

WRL's new 65 watt Xmttr. for 10-160M. Pi Network antenna tuner. 100% modulation of Final. Thoroughly TVI screened cabinet. Self-contained power supply.

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We offer the greatest trade-in values in the industry for your present rig! Let us prove it to you! Fill out our coupon and send it to us immediately.

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Save up to 50%. All reconditioned equipment carries a 90 day, factory-new guarantee on parts and workmanship. Send for our latest, complete list today!

Giant Size RADIO MAP

Large 36" wide by 28" high map, showing time zones, amateur zones and monitoring stations. Ideal for the wall of your shack. Only 25c.

Please rush ☐ **FREE** 1955 Catalog . . . and information on items checked below. Quote your top trade-in value for my: C-2

_____
(present equipment)

for your: _____
(New WRL Eqpt. Desired)

☐ NC-98 ☐ NC-183D ☐ NC-88
☐ E-Z Pay Plan ☐ Globe King ☐ Globe Scout
☐ Radio Map(25c) ☐ Reconditioned Eqpt. List

Name: _____

Address: _____

City and State: _____

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

YL's Frequency

(from page 40)

Last October 17th members of **W4HLF**'s *75-Meter phone net* (Tuesdays 8:00 EST 3900 kc.) held a picnic at Big Meadow on the Skyline Drive in Virginia. Arlie says they had a wonderful time—18 YL ops, 12 of their OMs and 25 jr. ops turned out. The YLs included: W1's UKR, VOS; W3's TYC, MSU, TSC, OQF, YWK, RXJ; W4's AJV, BLR, BQI, DBP, RIG, TVO, YYJ, WJX, KYI, HLF. W3OQF, Barbie, and OM gave prizes to the girls. Arlie received big rubber ears to listen to the net! (Also a lovely yellow rosebud corsage.)

Congratulations

To **W9MLE** on being re-elected president of the *Elkhart Amateur Radio Club*. Peggy is the only YL in the club.

To **WN9KJF**, Irene, on getting her license, with the help of her daughter W9MGT, Leonore.

To **WØUUK**, Lillian, on the arrival of her second YL jr. op, Barbara Jean, on Nov. 15th. . . . To **W1UBM**, Norma, on becoming the XYL of W1YOC in Sept.

Here and There

W9AQB, Norma, helped in CD communications during the Plymouth, Ind. flood, maintaining vigilance at her own rig and relieving as operator at W9AYP in Plymouth. . . . **W9PNK**, Hazel, is NCS for the *North Central Zone Net* and alternate NCS for the *Illinois Emergency Net*, all on 75 meters.

New members of *LARK* are **W9LAS**, Rose; **9LDK**, Adeline, and **9KFC**, Ruby. Three more *LARK* certificates, for working ten members of the club, have been awarded to **W8HWX**, Lillian; **9YBC**, Gloria, and **9LOY**, Cris.

Four new YLs joined the L.A. girls at their November meeting: **KN6EVX**, Lucy; **KN6HVC**, Marge; **K6ELI**, Doris, and **KN6GMX**, Jayne. . . . **W2PUY**, Selma, has left N.Y. to reside in North Hollywood; another member for the L.A. YLs.

Diana, **ZS6GH**, the "Galloping Ham," still gets around. While in Natal last summer Diana saw **ZS5TL**, Sylvia, and **ZS5KG**, Muriel, in Durban. In Margate she was happy to have personal QSOs with **ZS5OP**, Sue; **ZS5OB**, Edna, and **ZS5NE**, Enid. Diana says Enid was hospitalized for several years with TB of the spine, and it was while she was lying flat on her back that she became a Ham. Another YL who recovered from the same illness is **ZS8B**, Joycelyn. Through Ham radio she was up in half the time the doctors said she would be confined to bed. She and her OM, ZS8A, met over the air. They now live in the mountains in Basutoland—rare DX. Speaking of DX—Diana says there are YL operators in all of the provinces, from ZS1 to ZS9, covering South Africa, South West Africa, Basutoland, Swaziland and Bechuanaland.

33 till next month, *W5RZJ*.

SPARE PARTS ...

Modernize Your HQ-129-X

The manufacturers of the HQ-129-X receiver (Hammarlund Mfg. Co., 460 West 34th St., New York 1, N. Y.) have issued a "Technical Bulletin No. 114" which describes the installation of a new bandspread dial. This modernization step is for the purpose of providing 15-meter band calibration. The dial is available from Hammarlund at a moderate cost. For either items write to the above address and say that you saw it mentioned in *CQ*.

NOW HENRY DARES TO GIVE YOU THIS GUARANTEE

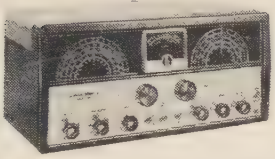
100% SATISFACTION
or Your Money Back at end of 10 day Trial

Bob Henry, WØARA Butler, Mo.

Ted Henry, W6UOU Los Angeles

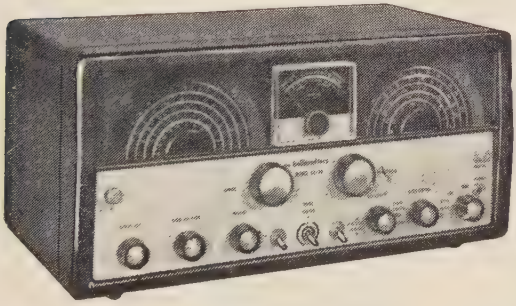
hallicrafters

NEW SX 96



For top performance with extra pull power and ability to tune in stations.

$25.00 Down
18 monthly payments of $13.60
—$249.95 Cash Price.



SX99—$15.00 down
18 monthly payments of $8.00—$149.95 Cash Price

MODEL	CASH DOWN	18 MONTHLY PAYMENTS	CASH PRICE
S38D	$ 5.00	$ 2.70	$ 49.50
S94	6.00	3.20	59.95
S95	6.00	3.20	59.95
S85	12.00	6.50	119.95
S93	10.00	5.40	99.95
SX96	25.00	13.50	249.95
SX62A	35.00	19.00	349.95
SX88	59.50	32.40	595.00

Only Henry gives you

- Top Trades
- Only 10% Down
- Easy Terms
- Fast Delivery
- Personal Service
- Low Prices
- Complete Stocks
- **We *want* you to be satisfied. Ask any Ham about Henry. And Henry has the new equipment *first*.**

Write, wire, phone or visit either store today.

Butler 1, Missouri
Phone 395

Henry Radio Stores

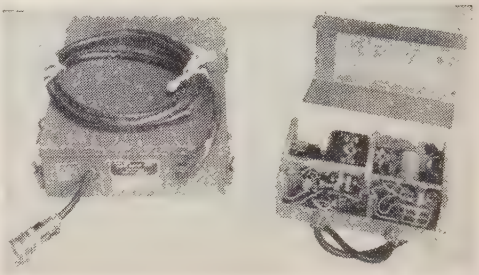
BRadshaw 2-2917
11240 West Olympic Blvd. Los Angeles 64

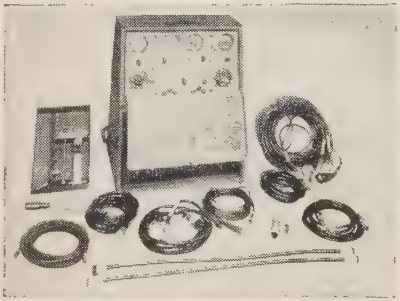
ESSE INVENTORY CLEARANCE SPECIALS

6 OR 12 VOLT POWER SUPPLY - - - $3.95

PE-117 vibrator power supply was designed for use on the Army BC-620 Transmitter and receiver a part of the SCR-509 and SCR-510. This will make an ideal supply for your mobile equipment on either the 6 or 12 volt cars. Voltage input changes are accomplished by merely changing links according to diagram in the cover (same vibrator used in either case). Supply is well filtered using choke input and plug-in type capacitors. Additional hash filtering is also incorporated for filaments of receiver. Output voltages are for transmitting 140 V. and 90 volts for receiving. The receiver output voltage is regulated by voltage regulator tube VT184. Maximum current drain is 100 Ma. Entire unit measures 12"x15"x4¾" in metal case or supply only may be removed for use which measures 11"x6"x4½". If you have no immediate use for this unit, it would be a good investment for possible future use. This is the type of surplus that doesn't last long at this price. Shipping wgt. approx. 32 lbs.

Brand new units - - - $4.95
Used good units - - - $3.95

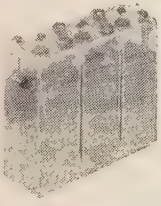




TEST SET EE-1A—Brand New—$39.50

Originally used to test turbo superchargers but may be cannabalized for parts such as combination AC & DC volt-ohm meter, variable speed drive as described on this page, manifold pressure gauge, .10-75 inches of mercury, amp. test gauge, adjustable pressure chamber, Fluorescent lights, aluminum case which folds together in center forming portable case size 2'H x 22" W x 12" D. with handles. (Makes ideal amplifier console). Olive drab crackle finish. Tool kit is also included containing slip joint pliers, screwdriver, torque wrench, tube puller, socket wrench set extension, & socket, spare fuses & bulbs, rt. angle drive, other accessories include 2—34" tack shafts, 15'⅛" hose with fittings, coil hi voltage cable/probe and clip, 75' 4 cond. #12 & 14 cable, miscl. other cables and plugs. Entire unit brand new sealed in evacuated metal can shipped in wood box. Wgt. 270 lbs. PRICE **$39.50** ea.

NEW STORAGE BATTERIES



ER-25-6, 6V. 25 AH.

Plastic case size 7½" x 2-9/16" x 6⅜" h. dry charged, fill as above.

New price
Wt. 7¼ lbs. dry. **$3.95**

STORAGE BATTERY 6 V. 34 AH

3-TA5-9B—Manufactured by Exide Battery Co. for aircraft. Size 5" x 5" x 9" overall. Shipping weight 15 lbs. New dry charged. Fill with 1.265 sp.g. sulphuric acid.
Price .....ea. **$4.95**

BB-54-A 2V. 34 AH.

Plastic case size 4" x 3" x 5⅜" h. Dry charged, fill as above.
Wt. 3½ lbs.
Price **$2.75**

ER-40-4, 4 Volt, 40 AH.

Plastic case size 6½"x5¾"x4⅜" h. dry chg. fill as above. Wt. 10 lbs. dry. Price..... ea. **$4.95**

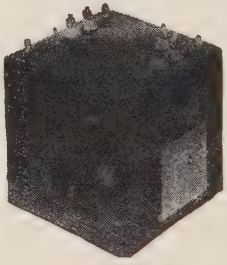


PLATE POWER TRANSFORMER

355-0-355 Volts @ 325 Ma. Also 490 V. 325 Ma. Primary 117 Volts 60 cycle. Measures 5" x 5½" x 6".

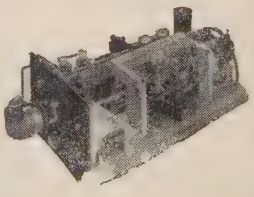
Shipping wt. 22 lbs. PRICE **$2.95**

H. V. TRANSFORMER

Output 1500 V., 5 MA and 6.3 V. at .6A 5000 V. test and 2.5 V. at 1.75 A. Input: 115 V. 60 cycles. Size 4½" x 5" x⅜" Shipping weight 6 lbs.
New Price .....ea. **$1.95**

T-39/APQ-9 RADAR XMTR

Described in Feb. '50 "CQ" for conversion for the 420-450 Mc. amateur band and citizens band. Also contains many parts for the UHF experimenter such as 2—8012 tubes, fan and motor, switches, pots, gears, counter, etc. Equipment removed from aircraft. Our Close Out. quantity limited. **$4.95** ea.

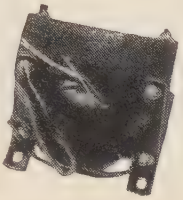


Shipping wt. 43 lbs.

MULTI-SECONDARY FILAMENT TRANSFORMER

9 secondary 6.3 V. at .01-3 amps. One sec. 2½ V at 2½ A; one sec. 2.5 V. @ 10 A. Two sec. 2.5 V @ 5A; Two 5 V. @ 3 A. 110 V. 60 cycle primary—up to 5000 V. ins. test. Size 5" x 5¾" x 6½" H. Shipping weight 21 lbs.
New Price .....ea. **$3.95**

12 V. VIBRATOR TRANSFORMER



300 V. @ 65 Ma. output. Ideal for your new car receivers. High quality type transformer designed originally for aircraft. Size overall 2⅞"x2½"x2⅝" ..... **95c** ea.

RETRACTABLE LANDING LIGHTS

Contains 600 watt 24 V. lamp. Use four of these in series on 110 V. for flood lighting or small motor and retracting mechanism easily adapted for your disappearing appliances in homes, etc. Used....ea. **$1.95**

POTENTIOMETERS 25 for $1.79

Here is a close out of many fine misc. Potentiometers put up in an assortment of 25 to include useful values from 60 ohms to 2 megohms in both wirewound and carbon, with & without switches, singles, duals, & triples, midgets and regular. Possibly no assortment alike so order several. You will save on the need of any one. All brand new controls.

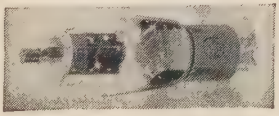
25 for $1.79

AN-80 ANTENNA

465 Mc. Antenna which may easily be trimmed for amateur use. Easily mounted for mobile use. Includes rubber gasket for rooftop. Matches 52 ohm cable, coax cable fitting included. NEW.

2 for 79c

1625 TUBE 12 V. 807



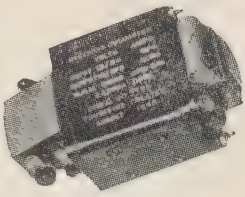
These tubes are 807's with a 12 V. filament making them ideal for new 12 V. car mobile transmitters.

New JAN boxed, guaranteed.....ea. **39c**
Lots of 10 or more.....ea. **29c**

IN-84 INSULATOR Pkg. of $5 — $1.00

Double cone feed thru type 2⅜" x 1¾" dia. Uses 1¼ in. mounting hole. Bolt size 5" long ¼" x 20.
New, in std. pk. of 5 ea. ..... **$1.00 pkg.**

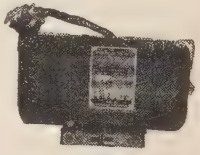
NEW DYNAMOTORS



PM DYNAMOTOR 12V.

12 or 24 volt DC input @ 8/4 amps. Output 275 volts @ 110 ma. Dimensions: 7½"L x 2⅞"W x 4¼"D. Ship. wtg. 10 lbs. ..ea. **$1.95**

BRAND NEW 12 V. DYNAMOTORS



DM-40 Input: 12-14 V. 3.4 A. Output: 172 V. -138 MA. Here is an ideal dynamotor to adapt to mobile uses on the new 12 V. cars. Don't pass up this buy even if your intended uses are not immediate. Size 6¾" L x 3½" dia. 4" lead with 6 pin Jones plug. Shipping weight 7½ lbs.
New Price.....ea. **$2.75**

274-N Dynamotor and Modulator unit

Output is 540 V @ 250 Ma. with 24 V, 7 amp. input, Modulator unit contains VR150-30, 1626, and 12J5-GT tubes. Wgt. 17¾ lbs. Units are used but good condition. Close out price .....ea. **$1.95**

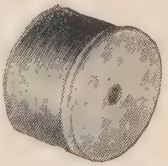
AN/ART-4 TRANSMITTERS with Target

These small battery operated transmitters were used to transmit a signal back to another plane when the 6 ft. by 30 ft. target was hit. Transmitters operated on 55.5 mc. and 56.75 mc. using 3A5 tubes. They have found favorable acceptance for conversion and use with model radio controlled planes and boats. The target is made of plastic screen which may be used for homes, patios, etc. as it will not rust or rot and outlasts any wire screen. Units are brand new and come in wood box 10" x 12" x 75". Ship. wt. 75 lbs. Our fortunate purchase of a great quantity of these allows for the low price so don't be misled. Many who ordered before have repeated for several more units. Our price while remaining stock lasts.

$3.95 ea.

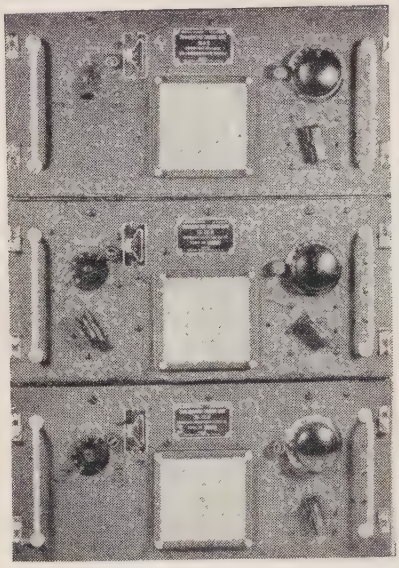
GUY WIRE—5,000' Spool—$5.95

Extra strong snarl, and rust resistant cable. Originalily used for aircraft control cable, has 21 strands alloy brass plated to resist corrosion. 350 lb. breaking test. OD 3/64". Ideal TV Antenna guy wire. Wound on wood & metal spool of 5,000' length.



Per spool **$5.95**

¼" Galvanized Stranded Utility Pole Guy Wires 500 ft. reels spool, only **$24.95**



TU-10-B TUNING UNITS — $1.95 ea.

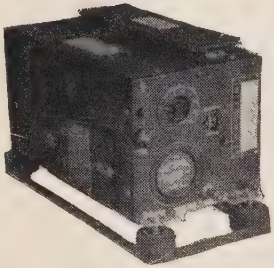
Used in the BC-375 transmitter, but the most favorable and acceptable piece of surplus gear for obtaining good cheap useable parts. The TU-10-B contains three double spaced transmitting type variable condensers of 16, 27 and 7 plate varieties, 3 mica transmitting type micas, 2 isolantite shaft couplings, antenna coupling switch, two precision vernier dials, chokes, inductances and other useful parts. Better order plenty before supply is exhausted again. TU-7, TU-9, and TU-26 also in stock, same price. Ship. wt. 13 lbs., size 7⅝" x 16½" x 7½".

Used — $1.95 ea.

New — $2.50 ea.

CAP & MOBILE HAMS ATTENTION!!

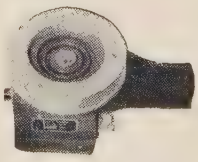
Transmitter — $3.95



Aircraft Transmitter—Either BC-430 or BC-230, similar except for supply voltage of either 12 or 24 V. (no choice as units are already packed by Signal Corps and no correct designation). These units are companion transmitter to receiver at right. Contains two type 10 and two type 45 tubes, 0-1.5 amp R.F. Ammeter and power output approx. 25 watts. Frequency range 195—13,975 Kc. Supplied with coil set 2500—3105 Kc. Other ranges supplied at 75¢ ea. coil while available. Size 6"H. x 6⅜"W x 11"D. Wgt. approx. 13 lbs. Sold as used however, many cannot be told from new. Shock mount base included in many but not all cases.

PRICE — $3.95 ea.

RL-42-B ANTENNA REEL/Motor — $1.95

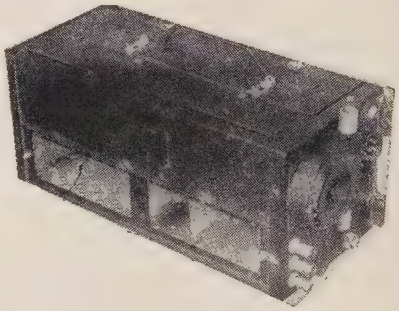


Used originally for remote controlling of automatic trailing wire antenna. Motor is ⅛ H.P. 24 V. D.C. with oil-less sleeve bearings. The gear train, breaking and disconnect mechanism, reversible and variable speed motor makes this an ideal unit for conversion to coil winders, etc. Ship wgt. approx. 5 lbs.

Good Used Condition — $1.95

Brand New — $2.75

RU-19 AIRCRAFT RECEIVER CW46048D



Here is a receiver that is cheaply priced that any one can afford and use. Made to operate from 24 V. DC and dynamotor supply not supplied but an AC supply or mobile supply can be readily adapted. Receiver uses 6 tubes, three of which are type 78, one type 77, and one 38233. Size of unit 14½" long x 6⅜" sq. Wgt. approx. 13 lbs. Similar to pict. Used good cond. supplied with either coil of your choice listed below.
Addn. coils 75c ea.....Total price ea. **$3.95**

Coils for rec. for following freq.

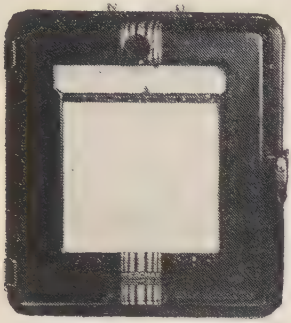
Dual coils	L-N	390-634 Kc. and 5915-9120 Kc.
Dual coil	Q-G	524-844 Kc. and 2960-4620 Kc.
Dual coil	Q-M	2960-4620 Kc. and 5075-7780 Kc.
Single coil	F	1975-3320 Kc.

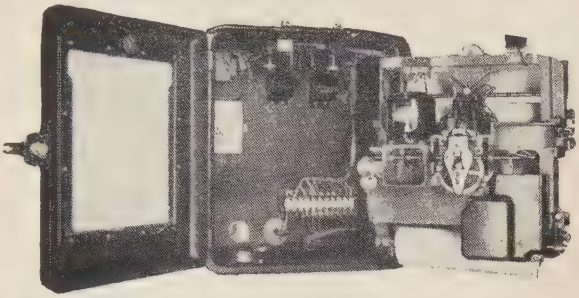
VARIABLE SPEED MOTOR — $11.50

1/10 H.P., 24 V. DC, 4200 Max. Rpm. Shunt type. Complete with speed control and Jaeger mechanical tachometer of 0-3300 Rpm. Has drive to fit the two 34" tack. shafts included. Wgt. 6 lbs.

Brand New — $11.50

SURPLUS—SAVE! SAVE!





LEEDS & NORTHRUP MICROMAX RECORDERS

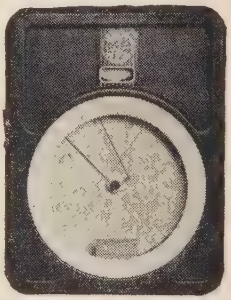
These are the strip type recorders used for controlling and recording a wide variety of processes. Used originally for temp. range of 350-550 degrees C. but may be changed for other applications. Operates on Wheatstone bridge principle using AC galvanometer movement. Original cost was several times our price. These units were removed from demilitarized equipment which in many cases was new; however, all instruments sold as used but guaranteed, or money back if not satisfied.

PRICE — $89.50

BAILEY METER RECORDERS

Used in applications as above at same temperature range, etc. Operates on electronic principles using vacuum tubes. Used but guaranteed condition.

PRICE — $49.50

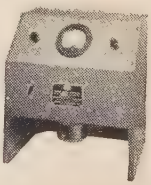


R-1/ARR-1 RECEIVER — $3.95

Described in "Radio TV News" Jan. 1949 for use as 220 Mc. converter. Essentially a two stage RF acorn tube superhet converter as it now stands. Small enough for mobile only 3½"W x 3"H x 10"D. Rugged Aluminum construction. Uses four 954 acorn tubes included. Filaments now operate on 12 or 24 volts by merely throwing switch in unit or very easily modified for 6 V. operation. Dial is calibrated in range of 234-258 Mc. Operation can be changed for use from 50 to possibly 300 Mc. Also, the ARR-1 could be used for a preselector. Wgt. of unit 4 lbs. Cover not shown but included. Complete with conversion as written in above mag.

Price, Good Used — $3.95
Price, Brand New — $5.95

ALPHA HAND MONITOR — $27.95



Brand new, mfd. by Barker-Williamson for the Atomic Energy Commission with acquisition cost of several hundred dollars. Indication of radiation made on O-20 micro amp. meter in panel. Only 27 in stock. No technical data available. A bargain if you know what to do with it.

$27.95

REMIT SHIPPING CHARGE AND INSTRUCTIONS WITH ALL ORDERS, OTHERWISE ORDER WILL BE SHIPPED EXPRESS COLLECT. ALL ITEMS GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED PREPAID WITHIN 10 DAYS OF RECEIPT.

ESSE RADIO CO.

40 WEST SOUTH STREET
INDIANAPOLIS 25, IND.

ELECTRICAL ENGINEERS
or PHYSICS GRADUATES

with experience in

RADAR *or* ELECTRONICS

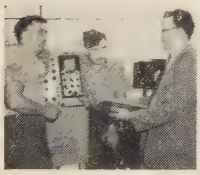
or those desiring to enter these areas...

The time was never more opportune than now for becoming associated with the field of advanced electronics. Because of military emphasis this is the most rapidly growing and promising sphere of endeavor for the young electrical engineer or physicist.

Since 1948 Hughes Research and Development Laboratories have been engaged in an expanding program for design, development and manufacture of highly complex radar fire control systems for fighter and interceptor aircraft. This requires Hughes technical advisors in the field to serve companies and military agencies employing the equipment.

As one of these field engineers *you will become familiar with the entire systems* involved, including the most advanced electronic computers. With this advantage you will be ideally situated to broaden your experience and learning more quickly for future application to advanced electronics activity in either the military or the commercial field.

Positions are available in the continental United States for married and single men under 35 years of age. Overseas assignments are open to single men only.



Hughes Field Engineer H. Heaton Barker (right) discusses operation of fire control system with Royal Canadian Air Force technicians. Avro Canada CF-100 shown at right.

Relocation of applicant must not cause disruption of an urgent military project.

Scientific and Engineering Staff

HUGHES

RESEARCH AND DEVELOPMENT LABORATORIES

Culver City, Los Angeles County, California

THE BRIDE

"Come up in the hills with me," he said, "I want you to see how I work my rig." I had been warned not to trust boys who asked me to go into the hills with them, but before I could say "no", the little Crosley with the 10-foot whip was climbing Mulhulland Drive. There we were—watching the lights of the city below us, full moon above us. I was even beginning to feel in the spirit of things—when out came the microphone and on went the switches. This was my romantic introduction to ham radio.

Six months later I married this boy, never dreaming what was in store for me. We started renting a small two bedroom home naturally, one for us and one for the ham rig. The first thing we bought was a stove—we had to eat. Next we purchased a bed and refrigerator. Then one day while my husband was at work, "it" arrived. The delivery men brought in crate after crate and I could hardly wait to open them. Thinking someone had presented us with a new sofa, or desk, or anything to help fill our empty rooms, I couldn't tear off the wrappings fast enough. And there it was—just the thing every bride can't live without—a 30-foot steel triangular telescoping self-erecting tower complete with automatic beam rotator, remote position indicator and associated wires, cables and plugs.

For the first few months of our married life my husband would be up every night until midnight, sometimes later. He had designed a transmitter and was busy putting his ideas to work so I hated to bother him. I didn't say anything—I kind of just secretly hoped he'd hurry up so that once in a while we could go to the movies or something. The unveiling took place and the rig worked like a little gem. Then the fun started. Bright and early at 3:00 o'clock one morning I began hearing the old familiar sounds (a pair of 6146's, push-pull and folding dipoles). I listened occasionally to some of his conversations and frankly, they couldn't have been more stupid. He'd be telling somebody about his rig and interject "hi" every once in a while. Later I found out when something is funny but not funny enough to laugh, "hi" is used. For instance: "XYL just had four teeth pulled—'hi'."

It was right around this time that my husband joined the local ham club. I went with him to a few of the meetings so that I'd have a chance to see him once in a while. These meetings consisted of the secretary reading the role (every member answering with his call), old business which was always who was causing who T.V.I. and what they were doing about it, and new business which was usually about the ham picnic to come. There was always one coming. Now, picnics to me have always meant swimming, fun-time, fried chicken and potato salad—but when hams talk about picnics, rigs and operating methods are their only

(Continued on page 52)

EXTRA . . . EXTRA . . . MESSAGE FROM OUTER SPACE TRANSLATED!

"Btsfligabob itchamug teeglebumfisk kepop allied migamoo boople moople fuddlebat allied blskft bigglebop." Thanks to the untiring efforts of the nation's greatest brains on language and cryptology, the Department of Cosmic Investigation today released a translation of a mysterious message from outer space. These strange radio signals, which have stirred the imagination of people in every corner of the earth, were translated as follows: "Hello Allied on Earth, hello Allied on Earth. This is the Red Sands Amateur Radio Club on the planet Mars. We've heard Earth Hams talking about Allied's out-of-this-world trade-in offers and we'd like to do business with you. How much can you give us on a Blskft 15-tube receiver with superdynatronic Cosmosynchrographic adapter and BFO towards an HRO-60? Give us good offer and we'll send down a saucer. Also advise if we should land saucer in your customer parking lot or at municipal airport." This first message ever received from outer space was promptly forwarded to the Communications Equipment Division of Allied Radio. . . . We'll agree that this news story is fantastic, but then, so are ALLIED's trade-in offers. If you're in the market for new gear, it'll pay you to write our Communications Equipment Division. Tell us the model number of the receiver you'd like to trade and what you want to buy—you'll be delighted with our out-of-this-world trade-in offer! By the way, our giant 308-page catalog is a must for every Ham station. If you don't have a copy, just drop a card to **Allied Radio Corp., 100 N. Western Ave., Dept. 16-B-5, Chicago 80, Illinois.**

(from page 50)

concern. While all this drastically important business was going on at the meeting I couldn't help eying the coffee and donuts awaiting us. But still the meeting went on and on. Someone got a 599 and the way everyone screamed you'd have thought he won $1,000. After a lot of unnecessary talk someone finally made a motion to adjourn the meeting. My mouth was watering by this time—I could practically taste the coffee and donuts. The motion was seconded and carried, and I cheerfully bounced out of my seat, only to find everyone staring at me. It seems that this business that had just ended was only half of the agony—the rest was yet to come. Now I ask you—what could be more exciting than an hour and a half speech by Pierre Moskowitz on "Hamming in the Sewers of Paris"?

I could go on about field day and the flies and the 120° heat, the message we sent to Mother in Los Angeles that somehow got garbled in transmission (and the frantic telephone call that followed), or the time we got lost hunting a transmitter. And then there was the day I got the shock of my life across a power transformer, but you have probably been through all this yourselves.

Now that I'm beginning to realize that being married to a ham isn't like being married to any other type of a man—professional or otherwise, I'm learning to take the whole thing with a grain of salt. I haven't meant to laugh at you people, I'm laughing with all of you. You see, I too got involved in this crazy but wonderful hobby and can be reached any day or evening by calling WN5EQW on 40 meters.

Viking Kilowatt

(from page 18)

grid and transformer secondary circuits on SSB and CW by means of a relay.

Safety and Protective Provisions

A lock-type main switch (key operated) is used to energize the filaments and rear a-c receptacle, is tamper proof and prevents unauthorized use of the equipment. An interlock switch removes the a-c input when the unit is removed from the cabinet and further protection is supplied by a choke across the r-f output which prevents plate voltage on transmission line or antenna in case of blocking capacitor failure.

Two arc gaps at the r-f output and across the modulation transformer secondary prevent

(Continued on page 54)

She shot the ashes off the Kaiser's cigaret

HER name was Phoebe Mozee and she was born in Darke County, Ohio, in 1860, and she could shoot the head off a running quail when she was twelve years old.

Once, at the invitation of Kaiser Wilhelm II of Germany, she knocked the ashes off a cigaret he was holding in his mouth.

When she out-shot the great exhibition marksman, Frank Butler, he fell in love with her and married her and they were ideally happy together for the rest of their long lives.

She could handle a rifle or a six-gun with an artistry unsurpassed by that of any human being before her time or, probably, since. And when she appeared with Sitting Bull and other notables in Colonel Cody's Wild West Show, she thrilled your father and mother—not as Phoebe Anne Oakley Mozee but as "Little Sure Shot," the immortal Annie Oakley.

Annie Oakley, the poor back-country orphan girl who made her way to world-wide fame, was the very spirit of personal independence. That spirit is just as much alive in our generation as it was in hers. It is among the great assets of our people—and our nation. And it is one very great reason why our country's Savings Bonds are perhaps the finest investment in the world today.

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(from page 52)

r.f. or audio overload damage and a hermetically sealed time delay relay prevents premature plate power application. The plate circuit overload relay, which may be reset electrically from the front panel, handles momentary overloads. Fuses are used in filament, bias and screen primary circuits.

TVI Suppression

The following TVI suppression features result in an amplifier with insignificant TV harmonic output:

1) Completely shielded r-f amplifier which is an integrated plug-in unit.
2) Compartmented amplifier construction to isolate r-f fields.
3) Shielded meter compartment with double *L* filters in all leads.
4) Double *L* section filters in all outgoing amplifier leads including high voltage *B* plus.
5) Contact washers on control shafts for effective grounding.
6) Shielded leads in critical field areas.
7) Low inductance by-passing at appropriate circuit points.
8) Closely spaced shield fasteners at junction bonds.

Power and Control Circuits

The rear of the pedestal has a cutout for access to three receptacles; polarized three-wire line for primary input (210-240, 50-60 cps); 117 volt line which is energized by the filament switch and may be used to power an exciter or other equipment if desired (thus providing single switch control of all filaments); and an octal socket for relay control and audio driver leads from the exciter. Two additional cutouts permit input and output coaxial cables to run forward to the r-f amplifier. A total of six relays are employed for control with the following functions:

1) *Primary Power Contactor*—actuated by filament switch, controls three—wire primary input to transmitter.
2) *Time Delay Relay*—prevents premature application of plate voltage before filaments are up to operating temperatures.
3) *Plate Power Contactor*—actuated remotely from exciter or control point, applies primary voltage to high-voltage transformer.
4) *HI-LO Power* — switches high voltage transformer primary connections for high or low plate voltage, actuated by *Mode* switch.
5) *Overload*—actuated by r-f amplifier plate current, breaks plate contactor circuit in event of overload. Electrically resettable.
6) *Shorting Relay* — shorts secondary of modulation transformer and modulator grids on SSB and CW, actuated by *Mode* switch.

A toggle switch is provided on the amplifier control panel which can be used to open the plate contactor control lead so that the exciter may be tuned without energizing the power amplifier.

Four fans are used to cool the equipment. Two are mounted within the plug-in amplifier with the others mounted at the back of the modulator power section—the lower one for intake of air and the upper one for exhaust. The four fans provide a "push-pull" continuous air exchange which results in uniform cooling of all tubes and components.

It is hoped that this presentation of design considerations will be of assistance to those amateurs interested in the construction of their own equipment and will further the trend toward modern design.

Acknowledgements

The authors take this opportunity to express their appreciation to the many people within our organization without whose assistance the development of this equipment would have been considerably more difficult. Our thanks in particular to Bill Warner who did most of the model work, trouble shooting and assisted throughout the entire project.

DX News

(from page 36)

will listen for W's on odd days from 0400 to 0500 GMT. A 1870 xtl has been sent him. **ZC4JA** runs 30 watts to a 270-foot antenna and will listen for W's on even days so as to not interfere with ZC4GF. **ZC4CA** will be on with 50 watts and 530-foot antenna until the end of January. **ZC4PB** may also be heard from. **YV5DE** is on 1890 or 1830 kc. with 300 watts. **YV5FL** has also been heard and uses VFO. **TI2BX** is quite in evidence on 1805 and 1830 with a *Viking II*. He hopes to be on every weekend, but

(Continued on page 56)

must QRT at 0630 GMT. Ted uses a 210-foot long wire. YU1GM received permission to work 160 for one week, around Dec. 28. . . . Oscar, LU3EL, runs 500 watts to a quarter-wave antenna and tries to be on each weekend when summer QRN (in Argentina) permits. W4KVM/-VO6 is located at Northwest Point, Labrador and runs a *Viking* to a 1000-foot long wire. Jim may be found on 1822.

GC2CNC and GC2FMV will be active from the Channel Islands. The former runs 4 watts and the latter 10 watts,

DX COMMITTEE NEWS

Roy Colwell, *W6LW*, has been chosen by the North California DX Club to serve on the CQ DX Committee replacing W6TT who has resigned due to business pressure.

1830 kc. . . . HB9T and HB9CM along with a few OK and HA stations have been reported working the G's. . . . VP7NG will be on 1880 with 40 watts phone/CW. Chas., VP7NM, will also be on hand every week-end. . . . Unfortunately all efforts of DL stations for special permission to work 160 have failed. . . . HR1UA professes interest in top band activities and may be on here. . . . Dave, W4ZQ, ex-W3PA, drops a tremendous signal into the Caribbean area with his 210-foot vertical BC antenna. . . . FLASH! A cable received by W3RGQ states that HK4DP will be on the air Saturdays from 0500 to 0900 GMT phone/CW. He runs a kilowatt and crystals have been sent him for 1870 and 1890 kc. . . . *TRANS-ATLANTIC TEST PERIODS:* JAN. 30th and FEB. 13th. . . . FLASH! FLASH!! VS6CQ made a top band contact with ZL1AH on Oct. 19th, 1010 GMT. VS6CQ, running 25 watts was 339 and ZL1AH received 449.

DX-ploits

Bill, W6SN, and Frank, W6SYG, cracked Mach 2.5 as they arrived at 250 together. The former snagging KC4AB and TI9UXX while the latter had help from MP4QAH and KC4AB. . . . Close behind is Al, W8PQQ, with KC4AB and HKØAI to rest on 246.. . . . Neck and neck are W2AGW and W8NBK at 246 with Howy reporting KC4AB and Arkie adding MP4KAC, HKØAI and KC4AB.

By courtesy of LU5AQ we can spot the country location of any LU-Z Antarctic station operating in 1954 as follows:
***South Orkney Islands*—Any LU-Z calls ending in the letters "A" or "M".**
***South Shetland Islands*—Any LU-Z call ending in the letters "C", "I", "O", "S" or "T".**
***Continental Antarctica*—Any LU-Z call ending in the letters "B", "H", "N", "D", "P", "J", "E", "K", "Q", "L", "F", "R" or "U".**

. . . Ed, W6TS, goes to 237 with eleven additions which include VP2DC, VS4RO, HKØEV and EA9DF. His XYL, Maxine, W6UHA, keeps pace by adding thirteen to reach 223 with such as FY7YE, LZ1KDP, Y12AM, HKØCV and VP5AE (Turks and Caicos). . . . Al, W6GDJ, ups to 235 with KC4AB, FQ8AX and ZDZDCP while VK2ACX heads the VK membership by reaching 230 with MP4QAJ, EA9DF, VS4HK and VS5KU. . . . Horace, W6TI, continues his slow but sure voyage to the top by snagging KC4AB for No. 226 while Roy, W6LW, slides over the 200 barrier with VK1DY, ZD6BX, VQ6LQ, KC4AB and OY2Z to rest on 201. . . . Thor, W6LN, comes up to date with eighteen additions giving him an even 200. . . . Bob, W3EPV, hits 254 thanks to KC4AB as Howy, W2QHH, QRP'ed his way

to 226 with KC4AB. . . . Bob, **W4GG**, inspired by overdue cards from **EA9DD** and **VP2GRO** went on to reach 216 with **MP4BBL**, **ZS8D**, **ZD6BX**, etc.

Ren, **W3KDP**, upped to 205 with ZD6BX and VK1AC while Buck, **W4RBQ**, topped the 200 marker with VQ6LQ, VK1AC and KC4AB to rest on 202. . . . A new list from Len, **W6WO**, puts him on 179 as Clay, **W6LGD**, rises to 172 with KC4AB, FQ8AX, and ZD2DCP. . . . Val, **VE3LJ**, marks time at 167 after keying with YI2AM, OD5AV, VQ6LQ, CR5AC and FM7WP. . . . Rip, **W4EPA**, goes to 166 with F9QV/FC and LU8ZS while Jim, **W5FXN**, hits 172 with OD5XX, VS4RO, VS1YN, VS2EB, KC4AB, HKØAI and MP4BBL. . . . EA9DF moved Bill, **W2HAZ**, to 115. . . . In the phone section Don, **W6AM**, went to 176 thanks to VQ6LQ and **W3EVW** moved to 167. . . . **K6ENL**, XYL of **W6LGD**, celebrated her departure from the novice ranks by quickly rolling up a 33-country, 20-zone total. . . . **W7UYE** went to 21 with CE3AG, DU7SV and KV4AA. . . . On 21 Mc. **DL7BA** is up to 107 while **DL7AP** has nabbed 102. . . . VK4YP was **ZA1BB**'s first VK QSO. . . . **W6VFR**, **W6CYI** and **W6NZW** snagged MP4QAH.

W1WLW hooked VP8AA, ZS3KG, CR7AF and HB1MX/HE to reach 112. . . . **HR1AT** rec'd *TTI*, *KZ5-25* and *WACE* Certificates. . . . HB1MX/HE was No. 131 for **K2BZT**. . . . The Delano Club Station, **K6BLL** made 750 contacts in all sections during the recent SS contest. . . . **VK4YP**, Pat, ex-VK3YP, shows a country total of 108 to show for six weeks work at the new QTH. . . . **W4ZAE** ups to 108 with such as VQ6LQ, F9QV/FC, FY7YZ and ZD2DCP. . . . Doug, **W9UKG**, went to 117 with HI6TC-(A3), FQ8AG, LU9ZM and FY7YZ. . . . Max, **W6ALQ**, had no trouble pulling in ZD2FFB, EA8BF, VQ4BNU, VQ4EZ, IS1CYN, LZ1KDP, JZØKF, SP9KAD, YO3RF, ZP5GM and HI8WA on 14 Mc. . . . **DX Ranger Certificates** have been awarded by the *West Gulf Club* as follows: No. 1, CE3DZ; No. 2, OY3IGO; No. 3, VK1BS; No. 4, VS2EB; No. 5, EL2X and No. 6 to JA1CR. Contacts for this award must be made *AFTER* Jan. 1, 1953. . . . After a Summer QRT, Bob, **W4TYE**, went to 71 with such stuff as FG7XB, CX5CO, ZS5AM and LA3C on 14 while 7 Mc. accounted for EA5BS, I1IT, LU1MC, ZS3HX and many others. . . . Joe, **W8KBT**, hit 21 Mc. with his *Viking II* and is up to 57 with I1TOB, EA7DK, VP1GG, ZE3JJ, GD3ENK and ZS1BV. . . . **W6WO** contacted one XG6A who claimed to be on Guanto Island in the Gulf of Mexico. Says QSL via *LMRE* (????). . . . **JA1SR** reports that ZS8 skeds ZS5QU around 1300 GMT on 7030. . . . **JA4BB** looks for Vermont to complete WAS.

FLASH!!

***W2AH*, who contacts ASCENSION ISLAND via commercial circuit, advises us that ZD8AA expects to be on the air some time in January. He will run 65 watts to an 813.**

Here and There

Phil, **W6AFI**, is on again after switch of QTH's from Berkeley to Livermore. . . . KV4AA logged visits from **W2NBT** and XYL Elinor, **WP4ABD** and **W2AOX**. . . . **W3WAF** seeks Utah QSO and may be found on 7006 kc. . . . **KR6AA** has returned to Ft. Benning, Ga. and Doc should now be heard signing W4VE again. . . . **4S7NX** needs an XE QSO to complete his WAZ. . . . **LU3HR** got his first VK when VK4HG was snagged. . . . **W2QHH** has new *Viking Ranger*. . . . **5A2FA** is QRT awaiting a 3V8 call. . . . Tom, **VP9BZ**, is W4MFR. . . . The *SHAPE*, F7, Club has been disbanded and QSL's should go via F7DZ (See QTH's). . . . We hope that Bayard, **W3AYS**, has now completely recovered from his recent illness. . . .

(Continued on page 58)

(from page 57)

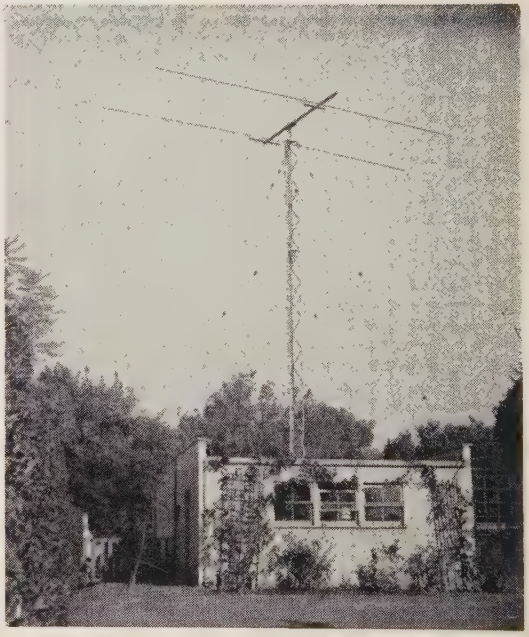
Finn, **LB8YB**, now in OX-land says that last of **LB8YB** QSL's should be on their way by January. **Fin** will be on from Jan Fayen for ONE day next Summer. . . . Fan, **FM7WN**, seeks Montana, Oregon and North Dakota to complete *WAS*. He may be found daily on 14 Mc. from 1300 to 1400 GMT except on Thursdays and Saturdays when he works phone on 14150 (Tks to W5KUJ). . . . *REMINDER:* Bob, **G2RO**, may be heard from Cocos as ZC2RO on or about Feb. 6 to 8. Then from Mauritius as VQ8AY. Also, If things went well, W6MHB, may be heard from TI9 around this time. **73 Dick**

Two-Element Beams

(from page 14)

15 Meters

A small duplicate of this beam was made for the fifteen-meter band. One-inch diameter elements were used, with ⅞" extension tips on the ends. The complete beam dimensions are

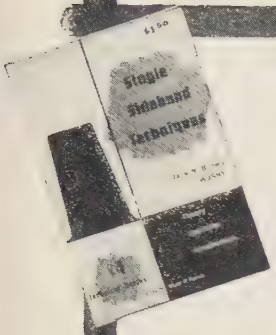


A view of the two-element parasitic installation at W6SAI.

shown in *Fig. 10*. The beam is light enough to be turned with a heavy-duty TV-type rotator, such as the *Cornell-Dubilier model TR-12*. One of the new TV crank-up towers may be used for the installation of the beam.

At first, the 15-meter beam was stacked above the 20-meter beam, with a separation of about

(Continued on page 63)

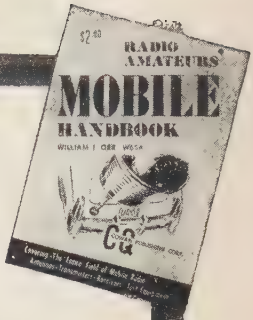


$1.50

Single Sideband Techniques

by Jack N. Brown, W3SHY

Wish we could say that we suddenly thought we'd better put something out on this subject—but, sorry—we just can't. Carefully written, prepared and edited, this book required six months to assemble. Regardless of whether you know quite a lot about SSB, or absolutely nothing—this is the text that covers it all—from start to finish. Half of the book is devoted to pieces of SSB equipment that you can build.



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by William I. Orr, W6SAI

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SELL: NC-183-D & speaker, $185. NC-240D & speaker, $165. NC-101X, $85. HT-9, $95. 32V-1, $375. 32V-3, $575. Want ARC-1, BC-610, ART-13, 75A-1, DY-12, ARN-7, TDQ. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass., Richmond 2-0916.

ALL-BAND, PHONE/CW, 25-watt transmitter. Pi-network ideal for Novice. All tubes, power supply, perfect condition: $25. Karl Thurber, 1610 Metropolitan Avenue, New York 62, N. Y.

SELL: NC-100XA, with speaker, $50.00. K2EXP, Stony Brook, N. Y.

SURPLUS—RG-8/U Cable 100 ft. $5.95; 250 ft. $13.25; 500 ft. $25.00. New connectors—PL-259 and SO-239 5 for $2.00. New oil-filled condensers—600 WVDC—2 mfd 69¢, 4 mfd 90¢, 7 mfd 95¢, dual 8 mfd $1.95; 1000 WVDC—1 mfd 69¢, 2 mfd 90¢, 4 mfd $1.59, 8 mfd $3.25. AN/APS-13 420 MC Transceiver with 17 tubes $15.50. Postage extra. Request new bargain bulletin. Visit new store for thousands of unadvertised bargains. Wanted to purchase—surplus radio equipment, Navy synchros. Lectronic Research, 717 Arch St., Philadelphia, Pa.

SELL: Several Triplett Model 3441 Oscilloscopes. New. Perfect condition. $169.50. Wayne Faith, W8AOV, Montpelier, Ohio.

FOR SALE: HRO-60 receiver. In A-1 condition, complete with matching speaker, six coils ABCDEF. Best offer over $400. Will ship anywhere in the U. S. WNØVKI, 2558 Ida Street, Omaha, Nebraska.

ARC/1 CHANNEL MOTOR brush caps 25¢. ARC/1 coupling shafts short & long $1.25 each. We will duplicate other samples. HRO-7. receiver 4 coils speaker mounted top cover, good condition. S. Giammanco, 74 St. Laurent Dr., Clarktownship, New Jersey, Rahway 7-8298.

FOR SALE: Complete Ham Station 30K, HRO 50, 32V-2, panadapter, mobile gear, meters, just about everything for Ham station. Write for list. Erv. Rasmussen, W6YPM, Box 612, Redwood City, Calif.

30 ft. triangular galvanized STEEL TOWER complete with 3-element plumbers delight 20-meter beam with gamma match, rotator and two selsyns. Used less than one year. Can be seen at 36 Van Schaik Road, Wyckoff, New Jersey, or contact Gene Yost, W2FMN, 163 West Prospect St., Waldwick, N. J. $250.00.

FREE LIST! New and reconditioned receivers, transmitters, etc. One hundred big bargains every month. Highest trade-in allowance. Write today! Dossett, W9BHV, 855 Burlington, Frankfort, Indiana.

NEW RK-4D32—$10.00. W4KGR, 2401 Parkway Drive, Winston Salem, N. C.

EXTREMELY EFFECTIVE twenty-meter rotary beam employing folded dipoles driven out of phase. Full size beam; exceptional mechanical strength. Literature upon request. Apex Antenna Company, WØEHF, 2558 Ida Street, Omaha, Nebraska.

BC-610 complete with 614 Speech Amplifier Antenna tuner, TVI 100%, B&W final coils, 807W, $500.00. Will consider B&W, Viking or Collins in trade. W. M. Fryer, W4HKT, 225 No. Green, Henderson, Kentucky.

TRANSMITTER KITS. 75 watts CW, Bandswitching, 160 through 10, $44.95. 25-watts $19.95. Write for descriptions of these outstanding performers. Hart Industries, 467 Park Ave., Birmingham, Michigan.

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Classified ADS

PORT ARTHUR COLLEGE. Port Arthur, Texas, provides training in radio, radar & television necessary to pass FCC exams for phone and tel. licenses. 12-14 months. Start any level, low tuition with board & room at cost in dorm. Advanced students on-the-job KPAC (500-watt station) training. Approved for Veterans. Write "Registrar" for catalog and info. New courses start every 5 weeks.

FOR SALE: Collins 32V-3, Like new—$590.00; Also 500-watt modulator, using 810s—1 KW modulation transformer—$45.00; 2500 volt DC at 500 mils power supply—$70.00; 3000 volt DC at 500 mils supply—$90.00; Push-Pull 4-125A's all band final, completely encased with 7 meters and integral grid and screen voltage supplies—beautiful—$225.00; Also high power triods and other equipment. Write for list. Tom E. Davis, Box 5, Willmar, Minnesota, WØSW.

FOR SALE: HRO-50T, ABCD Coils, extra bandspread dial strips, unmounted 12-inch speaker, works fine, $220.00 FOB; Simpson TV field strength meter, new condition, $50. W9PYT, 2175 Brentwood, Northbrook, Ill.

FOR SALE: Sell BC-221-J, SX-28, BC-652, BC-453, TBS-50, Commercial mobile radios. Mel Stricker, 65 Southern Ave., Dorchester, Massachusetts.

MOVING must dispose of Ham gear. Elmac and Gonset transmitter and receiver. 5300 VCT @ .775 AMP, tubes, other transformers and parts. Radio magazines and radio correspondence courses. Send for list. Frank Guetter, W9LHM, Orland Park, Illinois.

REAL BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, Johnson, Elmac, Barker & Williamson, Gonset, Morrow, Babcock, RME, Harvey-Wells, Millen, Meissner, Lysco, Sonar, Central Electronics, all others. Reconditioned S40A, $69, S40B $79, S76 $129, SX71 $159, NC57 $59, NC98 $119, NC125 $129, HRO50T $269, HRO60 $389, SP400X $259, HT20 $299, 32V1 $345, 32V2 $445, 75A2, 75A3, Viking I, Viking II, HT9, NC183D, many others cheap. Shipped on approval, easy terms. Satisfaction guaranteed. Write for free list. Henry Radio, Butler, Missouri.

FOR SALE: Best offer buys Hunter Cyclemaster and modulator unit. Excellent cond. WØTWX, Iowa City, Ia.

GELOSO VFO units used in W6SAI article, October, *CQ*, being imported, $35, tested & calibrated, without tubes. Gilfer Associates, Box 239, Grand Central Sta., N. Y. 17.

FOR SALE: Deluxe 1 KW plus. Two complete finals for 4-125's or 4-250's covering 80-40-20-10 including antenna tuner. Modulated class B pair 810's with clipper. Commercial speech amp. Separate heavy duty power supplies for final, modulator, grid and screen. All contained in two 7-foot cabinets with some room to spare. Good high grade parts, over $1200 worth. Will sell for $500. James C. Bailey, W9CLP, Macomb, Illinois.

GOING SSB: Complete mobile rig. TBS 50-D with VFO, wired relay push-to-talk $110.00; Heavy duty surplus 6v. dynamotor with relay, filter, wired for TBS 50, 400v 250ma, $35; Elmac PMR 6A mobile recvr $95; VHF 152A $40; Millen 90810 VHF Xmtr $60; Gonset 2-meter converter $28.50; Gonset 2 meter pre-amp $15. W6JYA, 215 32nd Ave., San Francisco 21, Calif.

BARGAINS: WITH NEW GUARANTEE: R9-er $14.95; Gonset Triband $29.95; S-72 $59.50; S-38C $35; S-40 $65; NC-57 $65; RME-45 $99; Lysco 600 $109; S-27 $99; SX-43 $129; S-76 $149; SX-71 $169; SX-42 $189; HRO-50 $275; HT-17 $32.50; EX Shifter $39; Globe Trotter $49.50; Harvey Wells Sr. $69; DeLuxe $79; Viking I $209.50; New SS-75 $189; early HT-9 $139; Globe King $275; 32V1 $395; 32V2 $475; 32V3 $575. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

32V2 COLLINS TRANSMITTER 41 hours total log time. New condition $400 cash. John Peters, R #1, West Bath, Maine.

BUY SURPLUS Radio Receivers, Transmitters, etc., from Government. List $1.00. Box AT 169, East Hartford 8, Conn.

GONSET COMMUNICATOR II cheap for cash. Also Communicaotr VFO, Gonset Super Six, Gonset Commander Transmitter, Gonset VFO, Gonset 2-meter converter. All guaranteed like new. W1KTJ, R. T. Graham, P. O. Box 23, Stoneham 80, Mass. ST 6-1966.

ALL MODELS ELMAC equipment in stock. Dow Co-ax Relays, Gonset, etc. 6 and 12-volt Dynamotors. W3HDT, Bob Wolfe Electronics, 2506 East Hoffman St., Baltimore 13, Md.

TRADE: Latest Bessa II, Ikoflex Ia cameras, 4x5 enlarger, darkroom equipment for ham transmitting gear, beams, hi fi gear, etc. Marcel Valois, B-488, Covington, La.

Will trade high voltage power supply components for 22 automatic pistol or 20 gauge pump shot gun. W7CSD, 1606 Clifford, Pullman, Washington.

Will trade COMPLETE 300-WATT RIG less VFO for complete mobile rig. WØMDV, Bloomfield, Missouri.

Sale or Trade: Federal xmitter, Eco, 813's, 600 watts; Polymeter; Chanalyst; BC-221-AK; and parts up to gallon size. W5KUZ, 1422 Woodland, West Monroe, La.

Will trade WARNER PLASTIC laminating press with some supplies and laminating course in perfect condition (used very little); for receiver. HQ-129X, SX-71 or equivalent. Arnold Tudor, 121 E. Warren St., Lebanon, O.

QSL Cards:

QSLs—SWLs! Quality cards and reasonable prices. Samples 10¢. MALGO PRESS, 1937 Glendale Ave., Toledo 14, Ohio.

Quality QSL's. Samples 10¢. Lee W5CZA, Box 7171, Oklahoma City, Oklahoma.

QSLs—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples 10¢, with catalogue 25¢.

QSL's—None Better! Craig Print, Box 157, Newark, Arkansas.

QSL's TWO COLORS, $2.00 hundred. Samples for stamps. Rosedale Press, Box 164, Asher Sta., Little Rock, Ark.

QSL's—America's Finest!!! Samples 10¢. C. Fritz, 1213 Briargate, Joliet, Illinois.

DELUXE QSL's. M. Vincek, W2LNT, 117 Center St., Clifton, New Jersey. Samples dime.

QSLs?? "AMERICA'S FINEST" samples 25¢ (refunded). Sackers, W8DED, Holland, Michigan.

QSL samples, dime, refunded. Gale, W1BD, Waterford, Connecticut.

Beautiful QSL cards free. World Printing, 166 Barclay Ave., Clifton, N. J.

QSLs. Samples—dime. Print Shop, Corwith, Iowa.

QSLs: New! Unusual! Different! 3 colors—$3.85 per 100. Two-day delivery. Satisfaction guaranteed. Rush order—get pleasant surprise. Fred Constantine, Bladensburg, Maryland.

QSLs. Same day service. Samples. Besesparis, W3QCC, Box 66, Frackville, Pennsylvania.

QSL's! Modern. Better Quality Designs. Samples 10¢. Tooker Press, Lakehurst, New Jersey.

QSLs. Why Fight It? The "Super-speed Special" is the card you need. Dozen samples 10¢. W9AYH, Dept-C, 12811 Sacramento, Blue Island, Illinois.

Wanted:

WANTED: Ham equipment under $100.00. New England, New York area. W1VJY, 2414 Washington St., Roxbury, Massachusetts.

WANTED: 25-watt modulator, also 2-meter transceiver described in QST, April 1954. K2GKK, Don MacDonald, Route 1, Lakewood, New York.

WE WANT YOUR USED GEAR. Highest trade-in allowance on National, Hallicrafters, RME, Hammarlund, Gonset, Morrow, Johnson, etc. Write or call, C & G Radio Supply Co., 2502-6 Jefferson—Br. 3181, Tacoma 2, Wash.

WANTED: #1 or 2 Gonset Communicator, at once. Just received my Novice and wish to work on my General. Glenn C. Bream, 145 Seminary Ave., Gettysburg, Penna.

CASH PAID for BC-610-E xmtrs., BC-614-E Sp. Amplifier, BC-939 or 729 ant. tuning units—also BC-221 freq. meters, TCS and others. Amber Co., 393 Greenwich St., New York 13, N. Y.

TOP DOLLAR PAID FOR ART-13's, dynamotors, parts, racks and all other component parts. Write: HARJØ Sales Co., 4109 Burbank Blvd., Burbank, Calif.

WANTED: APR-4, APR-1, APR-5, ART-13, ARN-7, BC-610, BC-614, BC-939, BC-348, BC-342, BC-312, ARC-1, TCS, RTA-1B, ARC-3, BC-221, LM, TS Test Equipment, CU-25, TDQ, TAJ, Teletype, Boehme, DY-12, RA-34, TS-174, TS-173, 32V, 75A. Will take any surplus or amateur equipment in trade for new Johnson Viking, Ranger, Barker & Williamson, Hallicrafters, Hammarlund, National, Gonset, Elmac, Central Electronics, Telrex, Fisher, Pentron, etc. Write to Alltronics, Box 19, Boston 1, Mass. Richmond 2-0048. Store: 44 Canal St., Boston, and 60 Spring St., Newport, R. I.

WANTED: A complete CREI Radio-Television or Television Engineering correspondence course. Standard 5-6 foot enclosed steel rack. Complete commercial ten-meter mobile rig for sale. Arden Ebert, WØWTE, 101 North Garth Avenue, Columbia, Missouri.

WANTED: Chicago BD-1, BM-1, equivalent quality xfmrs; TMA-150A, 100DD70, 100ED45 capacitors: 8mf 600v oils; 10h 200ma chokes; Panadapter; AC, H, J coils for HRO50; parts from dismantled BC station equipment. Cash or swap. Ed Howell, W4SOD, Lumberton, N. C.

AN/APR-4 receivers and tuning units urgently needed! Engineering Assoc., 434 Patterson Road, Dayton 9, Ohio.

TECHNICAL MANUALS WANTED: We need Sig. Corps, Navy and Air Force stock catalogs; Maintenance and Instruction TM's for war surplus equipment. Amber Co., 393 Greenwich St., New York 13, N. Y.

Miscellaneous:

Pass amateur theory exams. Check yourself with sample FCC-type questions & novice & general class examinations. All for only 50¢. American Electronics, 1203 Bryant Ave., New York 59, N. Y.

10, 15 & 20 METER BEAMS, Aluminum Tubing, etc., Perforated Aluminum Sheet for shielding. Radcliff's, Fostoria, Ohio.

TEST EQUIPMENT repaired and calibrated by factory staff. All makes. Hickok, Simpson, Triplett, Heath, etc. Prompt service. Low factory prices. Our nineteenth year. Douglas Instrument Laboratory, Norfolk Avenue & Shetland, Boston 19, Mass.

RECORDING FANS! Swap tapes everywhere. Details free. Box 1404-C, San Francisco 1, Calif.

BAPTIST PREACHER-HAMS LIST being revised again. Send name, pastorate, operating habits; be included; get copy free. Rev. Wes Miller, W5QNK, First Baptist Church, Chelsea, Oklahoma.

WORLD RADIO HANDBOOK, 1955 edition, $2.00 postpaid. Gilfer Associates, Box 239, Grand Central Station, New York 17, N. Y.

LAPEL PINS—Neat and professional looking—only 35¢. Your call engraved in white on black, black on white or white on red background, plastic, ⅜" x 1". W2SPV, 4309 Willis Ave., Merchantville, N. J.

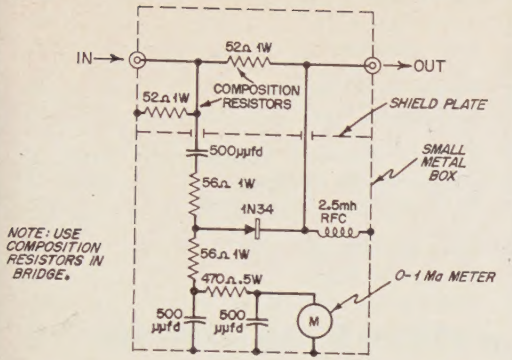

Fig. 9. Simple SWR measuring bridge for use with 52-ohm coaxial lines. A watt or two of r.f. at the operating frequency is applied to the "in" connector, and the r.f. level adjusted for full-scale meter deflection. The antenna coaxial line is then attached to the "out" connector. For SWR of less than 1.5:1.0 the meter should drop to 0.1 of a full scale reading.

4 feet between the two beams. A SWR check showed that the two beams detuned each other about 200 kilocycles. Oddly enough, the 20-meter beam was detuned to a lower frequency, while the 15-meter beam was detuned to a higher frequency! It was as if bringing the two beams together physically actually pushed them apart, electrically speaking.

The beams were used for a month or so, but the degradation of performance on each band was very noticeable. Over the objections of the

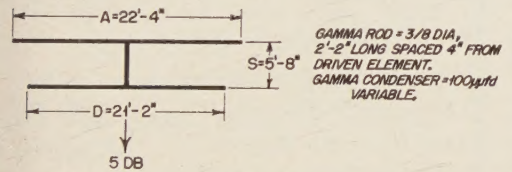

Fig. 10. Suggested dimensions of a 2-element 15-meter beam antenna.

XYL, a second tower was procured, and the 15-meter beam erected on it. It immediately began to "bore a hole" in the band. It is obvious that a little more thought must be applied to the problem of stacking two beams on one tower.

In any event, the operation of the beams proved the original contention: a 2-element beam is an excellent DX antenna for those who prefer not to decorate their house with a full sized 3-element wide spaced beam. Try it! I know you will be pleasantly surprised with the results.

CQ Ad Index

Become an honorary National Engineer!

LAST CHANCE TO WIN A $1,000 HAM SHACK!

or an NC-88 Receiver

National's big Honorary Engineers Contest closes this month — on February 28! All entries must be postmarked no later than midnight on this date. So hurry, pick up your entry blank at your National distributor.*

Just write down your idea (or ideas) for the ideal amateur receiver. You can be as technical or as non-technical as you like. National's sole purpose is to find out what the majority of you want or don't want in a receiver. (Acceptance of your entry does not mean it will be included in future receivers and submission of an idea doesn't obligate National to use it.)

Whether you win or not, you will receive a certificate as an "Honorary National Engineer."

National NC

NATIONAL COMPANY, INC.
61 SHERMAN ST., MALDEN 48, MASS.

*If there is no National distributor near you, write direct to the company, attention Contest Department, for your entry blank.

OFFICIAL RULES

1. Describe the features you would like in your "dream receiver." Suggestions can be as technical or non-technical as you like — anything from a circuit design to the style of a knob. Drawings or diagrams may be used. Please write legibly. Enclose your suggestions with a signed entry blank and mail to: Contest Department, National Company, Inc., 61 Sherman Street, Malden 48, Massachusetts.

2. You can mail as many suggestions with an entry blank as you wish. Be sure that a separate entry blank accompanies suggestions mailed at different times. You may file as many entry blanks as you wish.

3. An NC-88 will be awarded to the winner of each monthly contest. A grand prize of a $1,000 value ham shack will be awarded for the entry judged best from all winning monthly entries. A certificate will be awarded to each entrant, making such entrant an honorary National Company, Inc. engineer. The contest will continue through midnight February 28, 1955.

4. Anybody is eligible to enter the contest except employees of National Company, Inc., its advertising agency, and their immediate families. To be eligible an entrant must send a signed entry blank with his suggestions. To be eligible for any particular month's contest, entries must be postmarked no later than midnight on the last day of the specific month. Winners will be notified by mail.

5. Entries will be judged by a three-man panel composed of competent technically qualified personnel of National Company, Inc., each exercising independent personal judgment. All decisions of the judges will be final and will be decided by majority vote.

6. All suggestions submitted in this contest, whether awarded prizes or not, become the exclusive property of National Company, Inc., and are not subject to being returned. Entrants grant to National Company, Inc. all rights to suggestions, including the right to patent and/or copyright the suggestion. National Company, Inc. has no obligation to entrants other than to award prizes in accordance herewith.

RCA "HIGH PERVEANCE" POWER TUBES...

...for high power output at lower plate voltages

High perveance—a basic design feature of RCA power tubes—makes it practical to get the power you want at *substantially lower plate voltage*. Here's how this important feature pays off for you: (1) It enables you to use more reasonable values of pi-network components, (2) it reduces the need for very high-voltage plate transformers and high-voltage-rated filter capacitors, (3) it permits you to use lower-voltage-rated tank circuits, (4) it simplifies your rf and dc insulation problems.

RCA High-Perveance tubes—power triodes and beam power types—are available at your RCA Tube Distributor. For technical data write RCA, Commercial Engineering, Section L15M Harrison, N. J.

RCA High-Perveance Tube high power at lower plate vo

RCA Amplifier Service—Max. Amateur Ratings, Class C CW

RCA No.	Type	DC Plate Input (watts)	DC Plate Volts
2E26	Beam Power	40	600
807	Beam Power	75	750
810	Triode	750	2500
811A	Triode	260	1500
812A	Triode	260	1500
813	Beam Power	500	2250
815	Twin Beam Power	75*	500
829B	Twin Beam Power	120*	750
832A	Twin Beam Power	50*	750
833A	Triode	1000	3300
5763	Beam Power	17	350
6146	Beam Power	90	750
6524	Twin Beam Power	85	600
8000	Triode	750	2500
8005	Triode	300	1500

*Total for tube

RCA **RADIO CORPORATION of AMERICA**
HARRISON, N.J.